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ABSTRACT

This book is predicated on the theory that students and teachers are often overtense for various reasons and that tension control can be learned and utilized to improve performance and production. The first two chapters discuss learning and motivation in general. The next three chapters discuss the influence of home and national heritage on learning in this society. The sixth chapter focuses on the improvement of learning and attention through cultivated relaxation and is further delineated in the following chapters on memory aids and the programming of students. Chapters 9 and 10 deal with the role of emotions in education, and chapter 11 presents a new psychology for teachers to be used in confronting the tension of students. The next two chapters depict the overtense pupil and the effect that sex awareness, sex education, and drugs have on the tensions of students. Chapter 15 outlines current courses in tension control, and chapter 16 is a set of questions and answers about tension control. The last three chapters of the book are devoted to teaching tension control in the classroom for students over age 10 and below age 10. The last chapter of the book provides illustrated classroom practices. (HMD)

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TEACHING AND LEARNING

NEW METHODS FOR OLD ARTS

by

Edmund Jacobson, B.S., A.M., Ph.D., M.D., LLD

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To

ROBERT KAPLAN

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HOW TO TEACH

Tense pupils fail to learn readily. Their attention is scattered. They do not concentrate. Their thoughts are not focussed thoroughly on the subject being taught.

It is timely to correct this failure which in variable degrees is widespread in our schools and colleges. How to do this will be told in the following pages.

No less than in pupils, teachers need to learn control of their tension-efforts. Tense behavior in the teacher is communicated to pupils by imitation unawares. People tend particularly to imitate their leaders. Both in teachers and in pupils, nervousness can be avoided by acquiring relaxation skills and habits.

It is possible to be over-relaxed, thus not alert or responsive to what is going on. In vigorous people this is seen when they are sleepy, fatigued or ill. Congenital over-relaxation is marked by laziness, apathy, lack of ambition and emotion. It can result from individual or racial inheritance. Never does it result from relaxation-training. In sleep the more relaxed, the better. However, in daily action there is a golden mean between over-tension and over-relaxation. We can learn to spend only those energies needed to accomplish our purposes without waste. This is *differential relaxation*, which teachers can cultivate in themselves and in their pupils.

Attracting and holding attention are the mainstays of good teaching. Skilled teaching goes hand in hand with idealism. What is given to the pupils then is selected for its value and use.

Anyone can attract notice by shouting and by other acts of emotion and excitement. However, such acts do not belong to the teaching art.

We can list some measures formal to good teaching. They include clearness of enunciation with proper volume, accent and variation of voice. If blackboards or slides are employed, the light should be adjusted for all pupils to see clearly each detail discussed. Voice placement through training in school courses is preparatory. The teacher should learn to "throw the voice" to the last row. This training is a form of differential relaxation. In courses on public speaking, individuals learn to avoid monotony of tone. Variety favors holding of attention.

It is natural for teachers to be interested in their salaries, which they need to live on. However, it is important for them to be motivated toward public service. As the saying goes, "It is more blessed to give than to receive". Such motivation is instilled by parents during childhood, by ministers, priests and rabbis in temples of worship and by "old fashioned" books and periodicals. The teacher so motivated will tend to pass this influence on to pupils. Teachers in the public schools of Chicago during the "nineties" were often sources of inspiration to their pupils, as the author can well recall.

Motivation is not a force, but always is a form of message conveyed by inward forces. To compliment a teacher implies that he is a teacher of the good. We do not call a teacher "good" if he leads us into temptation. On the contrary, the good teacher typically strives to "deliver us from all evil".

The fidgety teacher will tend to make the audience fidgety, through imitation. Fidgets inhibit programmed thinking, which is the aim of all good teaching. Teaching is effort to impress. Effort always is muscular tension. Completely relaxed individuals would fail to teach. They would be inert, apathetic. Tensions requisite for good teaching include motions of the eyes in visualization of what is being discussed. The effective teacher visualizes what he talks about and may move his hands or other parts in appropriately suggestive gestures.

In short, the effective teacher engages in tensions appropriate to his subject but avoids excessive tension in any muscle. His tensions are present in some parts and not in others. Thus his tension is *differential*. The best teaching is marked by differential relaxation.

Success in education is our aim. Better attention, learning and memory are our chief objectives. From John Locke to John Dewey, classical authorities have never devised methods to accomplish these results. They are not to blame, since the understanding of man was not yet sufficiently advanced in their time. Our new understanding will be sketched in the following pages. It applies to every teacher and every pupil because it applies to all of us.

The methods we present have been developed for the populace. Accordingly in the following pages we shall try to describe them simply and directly. Additional accounts and further evidence will be found in the books listed on page 146

Our books on progressive relaxation and tension control are being put to use not only in America and other Western nations, but also among Communist peoples. The principles apply to all.

Among Western nations, the private profit motive prevails. Practically speaking, our culture largely stems therefrom. Businessmen generally understand that the expenses in any company must not exceed the available income. When they ignore this rule, they lose money and may become bankrupt.

As a people, we are generally more aware of our money than of our energies. Clearly, as money holds the key to success in business, so energy is the basic resource of our daily lives. Thus business practices are more advanced in our civilization than is the science and practice of everyday living.

In business, what is spent is money. In personal lives, what is spent is energy. *To save our money is to save our pocketbooks, but to save our energy is to save ourselves.*

Parsimony in business is not the route to success; nor shall we advocate parsimony in energy expenditures. Living completely relaxed is not desirable, for it would be only a new form of laziness. Proper living includes the pursuit of goals at the expense of energies. Accordingly we advocate useful living, by no means passive, lethargic or lazy. Useful living can prove costly. We shall describe "differential relaxation" as the economical way to be productive. Energy costs always are justified when they fit the gains.

Concerning energy costs, many a pupil will be interested to learn that just as an automobile burns gasoline in order to run, so he personally burns a chemical in order to move and think. He does not stop at a gas station to replenish his organs with fuel. Instead, the chemical he uses is adenosine triphosphate. Since he can not buy this for daily use to keep him running, it is his good fortune that he can manufacture it internally. Nature has provided him with a personal chemical laboratory which operates automatically for his welfare unawaredly.

Adenosine triphosphate has been shown to be the chief chemical we all burn in our muscles, nerves and brain for every activity. Energy sources in other respects include carbohydrates and fats.

In running our planes, pilots employ scientific disciplines. In running ourselves we ought to become no less trained scientifically. Thus we should all become interested in the *conservation of our personal energies.* These are internal to our bodies.

This conservation has much to do with the freedom which we all prize so highly. We do not here refer to political freedom which depends upon forces external to our bodies, but to freedom to advance our personal goals so far as these can be advanced by internal forces and direction.

Without training to relax, are we not all free internally? Yes, in the limited sense that no law can prevent us from thinking as we please. However, there is an additional kind of freedom which an individual can achieve. All over the world today people need but lack this kind of freedom.

They are held back by internal tensions. They lack the internal freedom to develop their best selves toward the accomplishment of their purposes and goals.

They are constrained internally, as no plane or automobile is constrained. In such machines, when fuel is wasted it can be simply replaced at the gas pump. But when the human machine burns energy wastefully in any specific activity, he is pursuing some goals and *inhibiting* others. This is the living mechanism, different from all machines built by man. These inhibitions, not so called in ordinary parlance, nevertheless are illustrated in many and various familiar personal experiences, as when we become anxious or overanxious about some particular difficulty. In contrast, an automobile (or even a computer) never becomes overanxious. Once aroused, our emotions push us in one direction or another so that often we tend to lose our internal balance and our integration.

Education in progressive relaxation tends to prevent this. It develops internal controls bringing a freedom never realized in prescientific eras. Each individual needs to learn and develop this for himself. There are no guarantees—no promises from teachers or doctors.

We present herein no panacea for mankind but only an educational advance comparable with past advances in other fields such as transportation or communication.

However, people who have learned tension control skills and who have taught the subject agree that it meets a universal need of mankind today and that it should be learned at any early age. It can help in the daily struggle for existence.

To be sure, educators have different purposes from doctors and tension control methods in classrooms differ from those needed in medical diagnosis and treatment. Doctors aim to improve health in using these methods, whereas educators can aim to improve learning, teaching, attention and memory. Accordingly, the methods to be used by teachers differ from those used by doctors.

Since tension disorders are a common source of physical and mental unfitness, especially in older and adult pupils, it is important that school teachers and professors become acquainted with the signs and symptoms of tension disorders and resultant organic disease, now so prevalent in our populace. (References, p. **146**)

We emphasize that classroom teaching of tension control is not directed to treatment of any disease. School teachers are not doctors and are not trained to treat ill-health, including tension disorders. Today, however, they are expected to report interference with studies from physical and mental unfitness, in order that the cases be referred to school or private physicians.

Tension disorders, like the common cold, are widely spread over the populace, including everybody. They include common conditions of irritable colon and stomach, marked by constipation, occasionally diarrhea, often leading to ulcer of the stomach or duodenum. In persons susceptible by heredity, they include various conditions of high blood pressure and coronary insufficiency, marked by "heart attacks". They occur widely in various forms of chronic fatigue, insomnia, nervousness, neurosis and even enter into organic psychoses as part of the symptoms. Tension disorders always tend to accompany organic disease in any form. Thus they are ubiquitous.

Teachers of tension control in schools possibly can help to prevent the occurrence of tension disorders later in life. If so, the national health will benefit in respect to preventative medicine. (Gymnastics may be another field of similar lasting benefit.)

How can anybody learn tension control? By grasp of principles plus daily practice! The learning will resemble learning to play golf or baseball or any other skill. Classical psychologists explained learning by what they called "association". When objects or matters in our experience resemble each other, or are together in space or time, they become "associated" for us. When we think of one, we think of the other. Since students knew that association must somehow depend upon what occurs in the brain, they wrote about "brain paths" and "brain corrections". Ivan Pavlov carried on more precise studies on dogs. His theory of learning was in terms of "conditioning".

All students of learning agree on the importance of repetition toward habit formation. A few emphasize that single experiences also may teach. We agree.

We shall emphasize that repetition is the key to learning tension control. Practice makes perfect, if the practice is correct. This can be explained by "machinery" in the brain. As we know, any act of man and animals tends to become habitual if often repeated. Obviously the energy cost tends to diminish as the act becomes mechanical, thus requiring less attention, -less effort. We are grateful to classic psychologists and to Pavlov and his many followers for their explanations. Today other forms of learning mentioned include trial and error learning, rote learning and perceptual learning. In the present text, we have no need to analyse in detail how man learns.

Accordingly in education as well as in medical practice, for different purposes, we use teaching methods. Like the patient, the pupil is taught enough about his own nature to enable him to direct his energies in manners previously unknown to him. Our text will describe in detail the teaching of tension control from childhood to old age inclusive.

TEACHING AND LEARNING

NEW METHODS FOR OLD ARTS

CHAPTER I

WHY AND HOW WE LEARN

From infancy we learn, in order to survive and prosper. This is our welfare response. The purpose is profit, gain, avoidance of loss.

Hardship often drives us to learn more. Nature provides this medicine as well as the antidote. Early we learn to walk and run and fall harmlessly. We are born with provisions for safety. These are built into our tissues and reflexes, but await stimulation and training. We have only to complete the learning process already begun by nature before our first effort.

Likewise our tissues are partly prepared for language when we begin life. We make sounds, which are readily provoked. From this point, when we learn a particular tongue, we are "on our own", in the current vernacular. Nature does not install provisions for English, Italian or other specific language, but makes all possible from the base up. This is true learning, while walking is partially instinctual.

Soon after birth we begin to learn salutory fears. Thus a burnt child dreads the fire.

Learning is a familiar event in man and animals. Many things are known about it from a common-sense angle. We all know the importance of repetition. Infants learning to walk are encouraged to do so and are stimulated over and over again. Interested parents employ repetition in rearing their children, whether human or animal. Those of us who follow television have witnessed impressive movies of lions, bears and other mammals teaching their offspring for survival.

In short, *repetition is the master key to learning.* We apply this when we practice sewing, knitting, golf, baseball and other common pursuits. Blunt realization of the formula can help us in programming our own learning and our helping others.

We learn best, as is known, when we give undivided attention. *Distraction disturbs learning.* The mother-bear teaches her offspring to climb in safety, when no marauders threaten. The classroom teacher often forbids pupils to play and talk among each other. Examples are countless.

Nature has designed us to learn and improve. We have not all received equal treatment. Some have been favored by heredity, environment and effective upbringing. We need her help, but as in transportation, television and many other practical matters, we can employ our talents and facilities to achieve further improvement and benefit.

Such is the aim of the present text. We plan to show how everyone can develop increased efficiency in his daily habits and pursuits.

CHAPTER II

MOTIVATION COMES FIRST

Education is training for life, which is always to be thought of as a succession of purposes. Accordingly, every course should be taught and learned while keeping this basic principle in mind. Pupils should be informed of it frequently in words befitting their ages and stages of development.

Why? Because pupils can not be *forced* to learn, as teachers well know. However, they can readily be *induced* to learn if they are made to apprehend what they have to gain from each lesson. This is known as "motivation". Another expression for it is the employment of "incentives". To inculcate "motives", to provide incentives, is a "must" in professional teaching. It can make learning a pleasure.

In the discussion of motivation and of other matters in our early chapters, some readers may find what they will term "obvious". If so, we request their indulgence, since a review of fundamental principles in education will need to include what some may regard as "obvious", while others may not. Furthermore, it is well known that the "obvious" is often by-passed. Indeed, we can emphasize that there is often a wide gulf between obvious principles and the habitual application of them in practice, which is the teacher's business to accomplish. Finally, whether obvious or not, bearing useful principles in mind tends to promote effective teaching.

There are teachers who appreciate the need of motives but provide the wrong kind. For example, one of my own children was promised candy if she would play and practice on the piano. The motive thus provided might be termed "external" or "secondary", in the classic terms of John Locke. Such rewards are unbecoming to the professional teacher, for they fail to interest the child in the skill desired. We changed to a more understanding teacher.

Elementary teachers are commonly aware that children like to play, and many apply this principle successfully. It is a good rule to bear in mind with elementary classes that the more a study is made to resemble play, the greater the appeal. When this is done successfully, the child is motivated unawares.

To be sure there are numberless ways to introduce motives in elementary classes. For example, in a class beginning to learn the alphabet, the teacher may say to her little ones, "Have you a pussy-cat at home? How many have pussy-cats? Those who have pussy-cats, hold up your hands! Do you know how to spell CAT?"

Countless other beginnings could be selected which might excite attention and direct the child's emotions. In the simple example given, the child is led to see a cat in imagination. The associated interest provides motivation in learning to spell.

If desired, the teacher may follow the procedures known in "Gestalt Psychology". As is current in many schools, the whole word "CAT" is written on the black-board, or included in a whole sentence, and/or a picture of a cat may be presented. Thereafter the teacher may present other words, such as "DOG" or "FLY". The letters may or may not be indicated as separable entities. There are different modern ways to teach the alphabet, among which one may choose.

Whatever the lesson, Teacher, be sure to tell them in advance what they have to gain! Thus you "program" them, to use a present-day term. Whenever possible, it is best to do so in one syllable words.

In classes up the scale in years, every teacher should plan likewise to begin lessons by inciting motivation except when the pupils are obviously well motivated. Why study ancient, medieval and modern history? Tell them what they have to gain personally, Teacher, if you want their interest! and do not hesitate to repeat your efforts to stimulate interest further during the course. Repetition is basic in motivating as well as everywhere else in educational method.

Effective teaching in school greatly resembles good salesmanship in business. The teacher sells his wares, in a sense, to pupils rendered desirous of them. I have listened to a professor of advanced mathematics telling his class of the importance of the subject and naming important people who study it with profit. I recall as well the increased interest and application of students in law, medicine, engineering and other professional departments of universities compared with the generally less intensive efforts in the colleges of liberal arts. The professional students are more intensively motivated. Evidently their efforts are less in courses where they visualize mostly theoretical rather than practical profit. For illustration, medical students generally show less interest in courses in physiology than in practical courses in surgery, diagnosis and the specialties.

CHAPTER III

OUR TURBULENT SOCIETY

Ordinarily we seek quiet for reading and study. In an extended sense, "quiet" means freedom from distractions. In this sense quiet is desirable, both without and within the organism.

Noise commonly increases with density of population. Horns, wheels, motors and planes add to urban commotion and distraction, contrasting with the quietude of countryside and forest. Disturbing noise is a form of "pollution".

Emotional states often tend to disturb continued attention in study. Figuratively speaking, this is internal "noise". In this sense the variable emotions attendant upon turbulent times tend to disturb the entire populace, including teachers and pupils. Thousands of protesters crowd the streets of Washington, D.C., in order to stop the functioning of U.S. Government, but are checked by even greater numbers of troops! The Democratic convention met with dissenters likewise, finally controlled by police. Riots in cities and belligerents on university grounds have been widely publicized in the press and on television. Where will it all end is a disturbing thought, answered variously among our populace.

Meanwhile crime in cities continues to increase and personal security often to diminish.

Emotions are excited also under current economic conditions. The "jobless" rate increases; strikes are concomitant; inflationary pressures provoke problems of many varieties. We could go on!

There are other emotional influences as well. Three wars have left emotional disturbances in their wake, beyond our powers to describe. Dissent from the war in Vietnam has been widespread and severe, often violent. Meanwhile, "sex" has received increasing popular attention. "Freud" and "Kinsey" for a while were on many tongues.

Problems of health confront us all and often prove disturbing. Sedatives and tranquilizers have become habitual to many. Pharmaceutical companies prosper, even if mental and nervous health does not. To excessive use of alcohol and tobacco (comforts to some in moderation) have been added common addiction to drugs, including marijuana (hashish), heroin and others. Many use stimulating drugs excessively.

To-day many college newspapers prove startling to "old-fashioned" people. They abound with protests against the American "establishment", its conduct of war and finance; complaints about faculty mismanagement with demands for student participation; complaints about courses, research and teaching. Parties and entertainments marked by nudity are indicated in some publications intended for dissidents; ads concerning abortions in others. Included may be suggestions for violence and revolution. In the lives of many, the contraceptive "pill" has become commonplace. Polls on chastity suggest a declining rate among our female youth. Magazines and the stage display various forms of nudity which would have shocked our Victorian forefathers. In the mouths of many of the young are what would formerly have been called "vile" language. Pornography has become commonplace.

"Activist" students see the world quite differently from the "old-fashioned" teacher. In psychological terms we might say that this new kind of internal "noise" distracts many students from study.

Turbulence presumably has numerous effects on family life as well as on teachers. There is no training school for parents. It is easier to give in than to discipline. In response to difficulties, problems and the stress of present day

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life, the moods and tempers of many parents tend to vary. What "the boss" has said or done affects the father, modifying his attitude at home. What the neighbors have said and done affects the mother. Parents can not trace the effects of "turbulence" but may suspect their influence when bright children bring home low marks and behave singularly, possibly suggesting the use of marijuana or other drugs.

Teachers to-day cannot ignore the growing use of marijuana, heroin, psychadelic and stimulating drugs among their pupils. Children are well-known to have imitative tendencies, thus lowering their resistance to follow the example of others who "experiment". As is well known also, children generally tend to resist following all the orders, advice and admonitions of their parents and other teachers. They like to be "independent". Consequently they are exposed to fraud and deception unawares. "Pushers" of these drugs tell of the thrills of experiments and trips and many children become their victims. We can agree that the teacher needs to have eyes open to these dangers in order to do what is possible toward promoting a healthy, moral society.

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CHAPTER IV

WHAT PRICE FREEDOM?

As Goethe said, "All beginnings are difficult!" Children are beginners at learning and they have far to go! Their muscles burn more fuel. They spend more energy.

Teachers generally recognize this by providing recesses. At kindergarten age, children often are permitted to walk about more freely and to play games introducing simple skills, such as coloring, drawing and handicraft.

Various habits of inhibition are part of what is taught to children. Particularly in early years, they tend to be less inhibited. Stories of their sayings and doings often appear comic to adults. They are taught rules of conduct including "manners". Often they resist. In some, "ill manners" persist. Then critics complain that 'they have not been well brought up'. "Obedience training" is more commonly given to pedigreed dogs. Visitors to Japan may note unrestrained conduct of little ones in restaurants and elsewhere. In contrast, among German children, obedience training sometimes has gone to an extreme. In Berlin in 1909 I recall middle-class children trembling and stammering when called into the presence of their father.

A famous American movie star relates that she "never says no" to her two-year-old. Evidently she believes in practically no restraints. Does she know what this really means? Does she know that orderly growth, behavior, law, thinking and every kind of practical success require proper balance between "Yes" and "No"?

This balance is the secret of successful education. Restraints from distractions are the key. Temptations to play need to be duly met. Older children need drill as well. Among adolescents, "dating" may dominate thoughts and activities to the extent that studies become emotionally unimportant and neglected. Low marks can be the consequence, even among capable pupils. Such bad habits may continue unless corrected by lengthy instruction.

Examples of balanced living are on every hand. Freedom to eat at will is not considered most healthful but includes restraint and selection. Some specialists advise against free use of dairy and other foods rich in saturated fats, preferring the unsaturated varieties. In the cells of every animal and plant, there are countless forms of inhibitory influences which balance facilitation. *In the healthy, this balance underlies every structure and function.* For example, the healthy heart has an inhibitory as well as facilitory nerve supply, along with chemical transmitters.

In daily life, to behave without restraint is disorderly. As previously indicated, both good manners and good morals are founded upon restraints; civil and criminal law are almost catalogs of inhibitions. In driving our cars, the red light means, "No!", the green means, "Go!"

Every time anyone learns, his freedom is restricted, in so far as he "sticks to the topic". He needs to avoid what does not bear on the topic and needs to avoid thinking about other matters. Learning becomes improved and argument more effective upon avoiding the incompetent, the irrelevant and the immaterial. Thus in effective thinking what is relevant is forwarded but what is unimportant for the purpose at hand is inhibited.

In short, all educational method should aim to facilitate what pertains to the purpose proposed. Incidentally, all successful inventors adhere to the same principle.

How the uneducated often flit from subject to subject unawares is repeatedly illustrated by William Shakespeare.

Characteristically they express any association that comes to mind, beginning on one matter and soon changing to another. To-day somewhat similar "free flow of ideas" characterizes the chat at cocktail and other parties. The aim is pleasure and diversion rather than pertinent discussion. Much of modern social life is carried on thus carelessly. Even American businessmen are more or less casual much of the time, becoming serious and logical in conversation only when they try to sell or buy or prepare to do so.

Nevertheless, when intent on any undertaking, not alone scientists, inventors, military leaders and privates, statesmen, politicians and others—everybody must depend for success upon favoring what is relevant and inhibiting what is not.

"Flight of ideas" is the phrase by which psychiatrists label a disorder noted among psychotic patients. The patient changes abruptly from one topic to another, making little sense in his speech. The changes are initiated by some minor component, some minor image or wording. Thus there is no logical course to his reflections. He flits from topic to topic following no program; he shows lack of normal inhibitory impulses, which always characterize healthy, purposeful thinking.

Thus "Yes!" and "No!" enter everything we properly do. In developing human structures and functions, Nature herself follows these principles of relevancy. Proper balance is foreshadowed in the classic law of the golden mean and is clearly basic to all computer designs. Nevertheless the perspective above presented is in some respects new in the history of thought and we can hope that it will in due course come to the attention of specialists, not alone educators, but also physiologists, psychologists and philosophers.

We now return to the view of the movie star applied to the education of her two-year-old. Where did she acquire her idea that freedom for children should be carried to the extent of omitting restraints—never saying, "No!" We can only conjecture that similar views, logically or illogically applied to many matters besides education, have flourished in America, dating from 1775, the war of liberation. Her view, we might assume, is directed more by emotional than by rational thinking. We can share her joy in civil liberty without this sentiment spilling over to daily conduct and education, thus obliterating restraints necessary for rational living.

In this regard, with many variations, most American parents tend to rear their children in fairly orderly manner, yet prizing the freedom of the land.

CHAPTER V

HOME INSPIRATION

Is there a man with soul so dead
Who never to himself hath said,
"This is my own, my native land?"

Every parent who prizes his role should realize his splendid opportunity in child rearing. The mother and the father can plant seeds and nourish their growth. They can watch and care for developments. "As the twig is bent, so grows the tree!"

Many parents do this naturally. Animals teach their young instinctively. "The great crested grebe often dives after fish while carrying the young ones on its back, and they soon learn their lesson." The same bird has been seen ducking the offspring, as if accustoming it to water. A more violent method of teaching has been observed by T. A. Coward: The guillemot may seize the offspring by one wing, fly out with it past rocks and surf, then let it drop. The young bird opens its wings and flutters. It takes its first flight to the sea, dives and begins to swim, while the parents stand by. L. J. Hobhouse relates that parent woodpeckers bring the seeds of fir-cones to their young, then partly opened cones, and finally intact ones. He considers preparing the family dinner partly a tradition, partly an instinct.

Observers report that among carnivorous animals, there are parents who bring a living captive and set it free in the presence of the young. Young foxes and stoats may accompany their mothers on hunting expeditions, gradually learning the art. The otter mother appears to offer detailed instruction to her cubs. It includes a sort of alphabet of country sounds, diving and lying quietly, capturing different prey, and ways of eating trout, eel and frog.

For those who employ the term "instincts", it is clear that various animals instinctively teach their offspring. If man has a rich supply of instincts, it is equally clear that to some extent, human parents begin to teach their young instinctively, in some measure at least. If so, it is an instinct well worthy of cultivation!

Repetition of instinctive acts leads to habits. In man, conduct varies vastly and indeterminably. Learning depends upon brain facilities not yet determined, by which an act is performed with less energy cost the more often it is repeated. Accordingly the act, whether it be in reading, golf, baseball or any other practice, tends to become more or less automatically performed.

This is the basis of learning, which as yet is not well understood. Brain-wave studies indicate that learning involves simultaneous processes in different parts of the whole brain.

In this, man and higher animals differ from machines. Through repetition they develop habits, good and bad. Machines do not and can not develop habits. A horse driven on a certain road many times will follow this road automatically, if the driver permits; but an automobile will not.

Habits thus are more or less automatic activities in and for living. They are cultivated by animal parents. Man's larger brain enables him to do more, especially if he sets out to do so early in the life of his young. Human parents can use precept and example to inspire their children for success, for understanding, for service and for loyalty.

Habits can be classed as "good" or "bad". Education includes the inculcation of "good" and the breaking of "bad" habits. The direct method to accomplish these ends will be related in our final chapters.

Under present conditions, American **parents** may be helped by adopting a program for rearing their children in each family somewhat on the following order:

(1) "Size up" each child at each age in respect to important features of health and disposition:

Is he generally healthy or not?

Has he frequent colds?

Is he free from eye and ear trouble?

Does he need doctors' attention?

Is he querulous, disobedient?

Does he suffer from constipation or other digestive disturbances?

Is he fatigued?

Does he get enough sleep and other rest?

Is he overactive, over-emotional?

Is he considerate or selfish?

Does he exhibit normal, desirable morals for his age?

(2) According to your answers to these questions and other similar ones, organize your approach to bringing up each child.

(3) Devise a definite program of rearing each year or oftener in accordance with the needs of the child

indicated by your answers. If necessary, seek assistance to do this wisely.

We should not assume that following the suggestions will answer problems arising in the rearing of each and every child. However, our aim can be toward a more thoughtful, better organized rearing, not only of the wayward but also of the tractible. In course of time associations of parents may be developed for effective counciling and resultant improvement of education of children at home.

CHAPTER VI

HOW ATTENTION AND LEARNING ARE IMPROVED BY CULTIVATED RELAXATION

Every teacher knows the importance of attention in class. When the teacher speaks, reads aloud or writes on the board, the pupils need to turn their eyes accordingly, looking where the action arises. If their eyes turn elsewhere, they will see and image matters not only unrelated to what is being taught, but also what will distract them from what is being taught. Thus unless there is good attention, teaching tends to fail.

Pupils whose muscles generally are overtense will prove more or less inattentive. They will be distracted. Their diversity of tensions will lead them to turn their eyes variably, as they think of one matter briefly and then of another. They will not concentrate. If playful, they will tend to give attention to each other, rather than to the instructions being offered. The young will tend to whisper to each other, laugh and engage in antics characteristic of their age. The older groups may reflect on irrelevant matters perhaps concerning present or future interests, such as what they were or will be doing, their sports, friends, problems, etc.

Good attention thus is not to be expected in overtense pupils. On the other hand, if the class is so relaxed in their muscles that they are drowsy, with yawning and closing of eye-lids, there is not enough energy aroused for them to turn their eyes steadily at the teacher and follow instructions. They will fail to understand and the direction of their vision and images will not be programmed in accordance with the teacher's lead.

The teacher needs to be on the alert, watching every member of the class. If tutoring one pupil, there is similar requirement for observation. Effective teaching requires observation of the behavior of every pupil. If one yawns, the teacher should turn in the direction of that pupil. Often it will be sufficient to raise the voice pointedly in his direction. It is not a good rule to speak directly to the pupil whose attention is laggard, but instead to employ every ordinary means toward reawakening and maintaining his attention to what is being said and taught. When a pupil recites, it is best that attention of the other pupils be directed toward that pupil and what he is saying.

Accordingly, the teacher will prove most helpful when pupils are neither too tense generally nor too relaxed. There is the golden mean for attention and learning.

Learning requires that the pupil *get the meaning* of words, seen or heard, and of the relevant gestures and behavior of the teacher. It is most important that the teacher, like the pupils, be neither too tense in general musculature nor overrelaxed. Here, again, what is best is the golden mean. For example, a wrathful teacher does not secure effective attention, but tends to distract the pupils from the meaning of what is being taught.

To learn is to get the meaning of what is being read, recited or taught. The learner uses his eyes to see printed words but also pictures what the words indicate. There needs to be an orderly succession of such pictures. Not alone does learning consist of orderly visual images, but accompanying these must be orderly, swiftly varying actions known as "silent speech". Measurements then show brief, miniscule activities of muscles of tongue, lips, jaws, larynx and breathing muscles. When we think and learn, we employ the same speech muscles as when we talk aloud, except that the muscle contractions are very slight, very quick and abbreviated. Thus in certain respects, "inner speech" resembles what is known as shorthand.

There is still more to what occurs when we learn. For example, if the pupil is being shown to draw or paint, his arm muscles will go through an abbreviated replica of drawing or painting. Similarly, if he is learning to make a play in tennis, golf, baseball or other sport. Even if he is being taught some abstract matter, such as how to perform an experiment in physics or chemistry, he will not only have appropriate eye-muscle tensions, along with visual and auditory images, but quite as pre-requisite will be miniscule activities of arm, neck and other muscles as if to represent how he should perform.

When teachers and pupils learn tension control, as per instructions in later chapters, they will at least begin to observe the miniscule muscle activities and the imagery that are necessary for learning. They will profit in their learning activities with increase of this ability at autosensory observation. The end result will be tension control, which means that the individual becomes skilled at giving attention and at spending his energies to get the meaning of what is being said and illustrated by the teacher.

Clearly, the teacher who learns to observe and control gross and miniscule muscular tensions will prove more successful.

Today many parents are gravely worried over their children in and out of school. Not only do many of our teen-aged youth not give proper attention, but also they lack interest and motivation. Also they often challenge their teachers verbally and sometimes physically.

We can offer no panacea. To the extent that turbulent pupils can be prevailed upon to follow on what we teach, so much the better!

E. B. Titchener held that the obverse side of attention is interest. As stated above, teachers of adolescents currently meet with lack or loss of interest in various forms and stages. With sexual development and interest chiefly on "dating", girls often show lapse in study. When dating is followed by sexes sleeping together, the resultant emotion may not be conducive to good work in school. Without deprecating natural interests in dating, it behooves the teacher to arouse such motivation in both sexes as will keep up their interest in school work and increase it further.

Upon muscular development, boys show interest centered, in sports. Teachers of physical education can build on this interest. Here, as ever, we realize that teaching is an important profession.

In this turbulent age, college teachers are confronted with problems largely unknown heretofore. Drugs, including marijuana, tend to lessen interest and attention to studies. Riots on campus add to other difficulties. Many institutions are obliged to get along without presidents. Emotions of dissidents often prove overwhelming, as in the disturbances at Kent, Ohio, marked by deaths upon police interference and control. "Leftists" raise objections to the present "establishment", including the Government of the United States. They object to present day faculty control, to research for national defense and offense, and especially to the draft and to the Vietnam war. It is said that their objections often are reflected in, if not stirred by, faculty teachings. The reader is referred to Chapter 3 on our turbulent society.

One result of turbulence in any form is lessened interest in many and distraction of attention from studies in all.

There is no simple, complete formula for teachers and earnest students to meet present-day difficulties with improved attention. All the principles and measures in the present text are designed to help in an era of turbulence but also in quieter times. So far as a single phase or slogan can prove helpful, it will be explained in the final chapters of this book; *differential relaxation.*

RECOMMENDED READING

What has been said in the early pages of this chapter is based upon the electrophysiology of mental activities, measured and reported for the first time in the following articles. It will be seen that thinking is not exclusively a brain process. Accordingly we can learn a certain control over our thinking processes through the same muscles as we voluntarily employ during our sensory impressions and our movements.

/1/ Jacobson, E.:
Electrical Measurements of Neuromuscular States during Mental Activities:

"Imagination of Movement Involving Skeletal Muscle", Am. J. Physiol., 91 (2): 567-608, Jan., 1930;

"Imagination and Recollection of Various Muscular Acts", Am. J. Physiol., 94 (1): 22-34, July, 1930;

"Visual Imagination and Recollection", Am. J. Physiol., 95 (3): 694-702, December, 1930;

"Evidence of Contraction of Specific Muscles during Imagination", Am. J. Physiol., 95 (3): 703-712, December, 1930;

"Variation of Specific Muscles Contracting during Imagination", Am. J. Physiol., 96 (1): 115-121, January, 1931;

"A Note on Mental Activities Concerning an Amputated Limb", Am. J. Physiol., 96 (1): 122-125, January, 1931;

"Imagination, Recollection and Abstract Thinking Involving the Speech Musculature", Am. J. Physiol., 97 (1): 200-209, April, 1931;

"Electrophysiology of Mental Activites"; Am. J. Psychol., 44: 677-694, October, 1932.

CHAPTER VII

HELPING PUPILS TO REMEMBER

Every teacher at times assigns home-work. This is included in the routine. What our "New Education" aims to accomplish for every pupil is daily help to learn and to remember.

Repeatedly therefor, we stress the importance of repetition. When any process is repeated in the brain, we can assume that as a rule the energy cost tends to become lessened. In other words, on the average, the process will cost less fuel for action of nerve and muscle (adenosine triphosphate) the n + 1st time, compared with the nth time. Electrical and other studies of brain action have not yet yielded a clear understanding of the learning process or of "conditioning". Accordingly the rule stated above is gross and merely an empirical conclusion. We need to make allowance for what experimentors call the "S" curve in learning, including a "plateau" often noted where repetition temporarily discloses no improved response.

Nevertheless, we need be in no doubt that within limits not always readily determinable, repetition belongs in daily teaching methods. However, the teaching art will be necessary to avert the boredom engendered by excessive repetition.

To appreciate the tool, we can remark that devices created by man do not learn by repetition. Thus the motor car or the plane never save energy through repetition of a route. They never learn. However, a horse driven over a particular route repeatedly tends to follow it upon repetition and resists change. The animal, like ourselves, develops automatic or semi-automatic responses, commonly called "habits". Machines have no habits, good or bad, for they have no nervous systems.

Various other means of helping pupils to remember have been included in previous chapters. Particularly we have emphasized motivation and capturing and holding the attention of pupils. We have stressed the occurrence of inhibiting fears and have suggested ways to avoid them. We have related about the detracting effects of divers forms of distraction.

We must not neglect the importance of feelings and emotions for successful learning. Teachers need to realize that some pupils react more sensitvely than others to almost whatever is said or done in the school-room. Also they need to realize that some pupils during learning hours will tend to maintain states tantamount to emotional distraction. There will be pupils of every age, particularly the older ones, including the elderly, parts of whose digestive tracts will be overtense, even spastic. This response may hold over from previous experience of the day, the week or even the month. The response is tantamount to fear or other distractive emotion and is readily notable by x-ray techniques. /1/ The response which render the pupil less accessible, is best treated, according to the author's experience, by tension-control educational methods. These will be described in later chapters.

Furthermore, it is believed that these methods can prove helpful for educational pursuits in many respects additional to memory.

The interested teacher may note change in the attention and learning habits of certain pupils requiring investigation. Are they due to sensory inefficiency or to any form of illness? Are they due to commotion at home, such as dissension or impending divorce? Answers to these and similar inquiries may prove helpful.

Students distinguish between immediate and lasting memory. /2/ The usefulness of repetition applies to the latter variety. Immediate memory apparently is forwarded in pupils and others by whatever factors attract and hold attention.

Any measure that helps learning likewise improves memory. Foremost among such measures is programming of pupils, which is discussed in the following chapter.

NOTES

/1/ Jacobson, E.: Progressive Relaxation, University of Chicago Press, rev. ed. 1938, Chapter XIX, pp. 357, ff.

/2/ Adam, G. Biology of Memory, Plenum Press, N.Y. 1971.

CHAPTER VIII

HOW TO PROGRAM PUPILS

In order for a computer to be useful, it must be programmed. The same holds true for human beings.

We come to a matter new in psychology. Our readers may be unfamiliar with the term. Nevertheless the conception marks a great advance in our understanding of successful teaching.

Repetition, we have said, is the key to learning. This applies likewise to programming. Adults no less than children will the more surely respond when the desired programming is sufficiently repeated. Boredom, to be sure, must be averted. In contrast, a computer needs to be programmed only once for each task.

In retrospect, we can recall psychological studies at the Wuerzberger University of Germany in the era of 1908. The names of Ach, Buehler, Watt and Messer became well-known in connection with their endeavors to determine the mental processes in subjects during moments when they were about to press a key in response to a light, sound or other signal, in accordance with a set instruction. Not only reaction times were determined but also various tasks were assigned.

The investigators agreed that psychological processes were present, leading the subjects to respond according to instruction. "Muscular sets" seemed to them present, but methods to record these were not yet invented. /1/ Some investigators emphasized that visual and other images carried the understanding of what was to be performed and when. Others disagreed, insisting that the preparations for performance were "imageless".

It became the vogue to allude to the antecedents of performance following instructions as "determining tendencies" or "mental set", while what was to be done became known in German as *"die Aufgabe"*, badly translated into English as "the task".

In the author's laboratory, aided by observers trained in autosensory observation with a detail and precision not yet attained by the German professors mentioned, the processes of carrying out an instruction have been clarified. On the physiological side, the investigator can identify and record neuromuscular processes and the subject reports kinesthetic sensations which *signal* to him what he is doing to prepare to carry out the instructions and preparations to carry them out. Thus in psychology we identify signals and meanings much as we did in telegraphy when the Morse Code was in vogue. In telegraphy, the electrical signals carried the mesages. In programming persons, the messages are the information what is to be done. The signals generally include sensations of tension in eye muscles when for an instant or more or less steadily, the eyes move or fixate in a particular direction upon visualizing the objects and surroundings concerned in connection with the stimulus which is to denote the instant for response according to instruction. Also ocular tensions and movements occur and can be recorded and the subject reports sensation therefrom denoting what he is to do. Muscular tension signals, steady or intermittent, however slight, occur in the arms or other parts which are concerned in carrying out the assigned task. Indeed, the musculature of the entire body generally is more or less tense or relaxed differentially in preparation for any "performance", "mental" or "physical".

In addition, we record and the subject may report signals or muscular tension in parts of the speech musculature, most often including tongue and lips. Employing "incipient" or "silent" speech, he recalls in words what he is to do, while also hearing the instruction, perhaps in tones employed by the experimentor.

Thus, following the brilliant original studies of the German investigators, our investigations leave us in no doubt about "imageless thought". Some of the "thought" is indeed "imageless", if we wish to employ that term. However, preparations for any performance commonly include not only required incipient neuro-muscular activities, as when athletes are told to "get ready", later to "get set" in races. In addition, a complex set of neuro-muscular signals from sense-organs which must act in one pattern or another are present with visual, speech and sometimes auditory imagery to indicate the manner and choice of response; in other words, the course to be followed.

If the reader will conceive human response in daily living after the patterns delineated above as determined for performance of any task under laboratory controlled conditions, he will be suitably prepared to understand what we now call human "programming".

It is no simple procedure, scientifically speaking. Each individual, we need to understand, during waking life continually engages in *appraisal* of the total situation in which he conceives himself from moment to moment. In this, with the devises of complex brain facilities only beginning to be understood and recorded by electroencephalographs up to date, he "scans" signals from his twenty or more sensory systems, attending some, neglecting others. Thus at each succeeding minute or other unit of time, he notes conditions external to his body and also internal, tending to classify them thus, however vaguely.

During this complex of signals with their meanings to him, he undertakes some task, superimposed, so to speak. For the time being, these particular signals and meanings come to the foreground; they receive his attention.

What then is programming of self in human affairs and what is programming by teachers and what is the use?

Self-programming is the self-inspired motivation for an act or set of acts. The motivation is carried by imagery with attendant activation of sense-organ neuromusculature plus the feeling-tone from visceral organs upon evaluation of the ends in view. The preparation for the acts programmed is variable, particularly if what is to be performed is to be carried out over weeks, months or years, as in career-planning. Our purpose in the present chapter is to present a sketch or "general idea" of programming. We might liken this objective to first lessons, how to program a computer.

Programming by the teacher or by parents or others involves relatively similar psychophysiology. It seems unnecessary to indicate the differences, since these will likely be obvious.

We should be aware, however, that in daily life, people, including students, tend to be subject to programming influences from many and various sources. These include friends, but also enemies; teachers, but also other pupils; books, magazines, newspapers, radio, television and others. In effect, the programming from one source often is abetted or opposed in all or in part by that from other sources. These inevitably reflect the complex influences which bear upon the daily lives of us all.

The children we teach never behave like putty in our hands. Their dispositions are not for us to mold as freely as we will. Always, like people in general, they tend to have their likes and dislikes, inclinations and their disinclinations, their abilities and their limitations. They will be open to direction in some channels while resistant in others. They will show facilitation in various matters, perhaps unexpectedly in some, while showing inhibitions in others, which may appear unaccountable. They may show affection for reasons not apparent or hatred which proves puzzling. They may accept our ministrations gratefully or may respond with indifference. Some will expect every sacrifice from parents yet exact no return from themselves. Children do not always respond gratefully and with love when fondled devotedly.

In short, teachers and parents will meet with an endless variety of responses, often contrary to their theories. Accordingly they should regard their expectations as far from final, but nevertheless proceed to program hopefully.

The very first rule in programming is to provide motivation, if not already present. Often pupils need to be shown what they have to gain from a particular subject and from learning in general. The teacher should be alert to awaken their curiosity and their desire to profit. When the pupil recites and uses information in any manner, this is naturally rewarding. Successful teaching depends upon programming and reward.

What if the pupil shows no eagerness for what is to be programmed? What if he does not aspire?

Teachers should realize that not everyone, young or old, is interested in the future. Often their self-programming looks chiefly to the present. To such individuals, the author often has had occasion to relate of the hen in the barnyard picking at grain and gravel. If the farmer's daughter were able to speak hen-language, she might say to the hen, "Why pick at corn, when tomorrow your head is to be chopped off?" The warning would fall on heedless ears, for the hen's brain does not enable her to picture the future.

Excepting infants, people at all ages have ability and often inclination to picture the future in various respects. Often, however, their inclinations are inhibited, sometimes to the extent that leads toward comparison with the fabled hen. Teachers will need to realize the variability of pupils in this regard, even including that of parents. They may even need to recognize their own limitations.

In short, to program computers we need to follow rules and to employ our imaginations toward determining what routes we will need. To program people, however, we need to devise our approaches as appropriately as we can to each individual or class. Even so, we will be better prepared to teach if we know some of the general features of programming as applied to human beings in their baffling complexity.

We need to realize furthermore that reasoning in individuals can become channelled strikingly and that the same applies to classes and communities, indeed to whole nations. Thus one class may appear unseeing, stubborn, stupid, indifferent or excited over issues to which another class respons quite differently. Accordingly when it becomes our task to program others, or even ourselves, knowledge of the trends of reasoning in our pupils becomes essential.

Programming is indeed a vast subject. Every civilization, every culture, every politic, every science, every art is characterized and distinguished by the functions it programs. Included are the functions it plans to inhibit—the restrictions on freedom. Accordingly, we shall not pretend that herein we have done more than to introduce the subject to teachers.

We can, however, close our chapter on an important note. Appreciating what teachers can do to support and improve any culture, while realizing that the pillars supporting our own civilization are those of freedom under the profit motive, we can urge every member of the profession to program himself devotedly for public service.

NOTES

/1/ See, Jacobson, E.: Modern Treatment of Tense Patients, Charles Thomas, Publisher, pp. 16, ff, 1970.

CHAPTER IX

FEARS

Even happy lives are never quite free from fears; they flourish in the unhappy. Educators need to know about the role of fears in themselves and in their pupils.

Fears are among the "necessities of life", for our security often is based upon them. They are part of our efforts for welfare, useful in moderation, but burdensome when excessive or ill directed.

School-teacher John Holt has written a popular book to explain WHY CHILDREN FAIL. On many pages, he attributes failure to their fears.

"What is most surprising of all is how much fear there is in school. Why is so little said about it? Perhaps most people do not recognize fear in children when they see it. They can read the grossest signs of fear; they know what the trouble is when a child clings howling to his mother; but the subtler signs of fear escape them. It is these signs, in children's faces, voices, and gestures, in their movements and ways of working, that tell me plainly that most children in school are scared most of the time, many of them very scared. .... the scared learner is always a poor learner." /1/

According to John Holt, some pupils live in fear of being wrong and being marked wrong. Many fear displeasing the teacher. They develop strategies to get good marks instead of efforts to understand what is being taught. John Holt even believes that teachers, like himself, unawaredly play upon the fears of their pupils. "I am horrified to realize how much I myself use fear and anxiety as instruments of control (page 96). What I do boils down to a series of penalties, which are effective in exactly the proportion that they rouse the kind of fears that I have been trying to dispel, Also, when children feel a little relieved of the yoke of anxiety that they are so used to bearing, they behave just like other people freed from yokes, like prisoners released, like victors in a revolution, like small-town businessmen on American Legion conventions. They cut up; they get bold and sassy; they may for a little while try to give a hard time to those adults who for so long have been giving them a hard time. So to keep him in place to please the school and his parents, I have to make him fearful again. The freedom from fear that I try to give with one hand I almost instantly take away with the other. What sense does this make?" (page 97)

The intelligent, observant, thoughtful teacher whose words we quote evidently is unfamiliar with techniques for fearful children and others. In our experience children need training in progressive relaxation to prevent the tensions and the ill-results which he so clearly describes.

Also, from our experience we can recommend relaxation training in schools and colleges toward diminishing the tension states of students when preparing for examinations and taking them.

Fears have inhibiting effects on attention, on memory and on learning. Accordingly, teachers have very good reason to teach children to relax disturbing fears. To do this effectively, they will need to learn relaxed habits themselves. Thus reciprocating benefits can be achieved.

To what John Holt has said many things can be added concerning fears. In school as elsewhere protective fears abound. Thus children often warn each other "how hard" will be a following course in mathematics or other subject, which thus comes to be dreaded. In this manner children commonly handicap each other; for they become programmed in dread rather than in interest. This dread can be more easily avoided in children taught exclusively at home, but, as we know, such teaching is lonesome and is beset with social disadvantages.

Leaving the school-room, we can take a wider look at fears in current affairs and in history. In present day hazards, safety is favored in pedestrians by fear of being run over by vehicles. Drivers are warned against intoxication. In fearfulness, national differences are notable. Londoners can be seen walking with their backs to oncoming traffic with an unconcern not usual in the United States. Upon inquiry, the accident rate was said to be relatively high. Today in Tokyo Japanese taxi drivers often take chances uncommon in most other countries under similar road conditions.

Fears of pollution are widely publicized today in the interest of welfare. These might be classed as "good" or "helpful" fears. We emphasize this in order once more to belittle the general belief that fears are always on the debit side of life's ledger.

Fears dominate historical events of many varieties. In ancient and medieval times man built fortresses and castles surrounded by moats or on hills. These structures impress tourists by their beauty and construction, seldom recalling the terrors of their origin. A journey along the Rhine today may thus awaken mixed emotions. The river itself is celebrated in the German national anthem, stirring the nation to rise in defense. Here we note the role of protection and the underlying fear of invasion. Quite another concern was notable in the Russian national anthem of Czarist days: "Give to us peace in our time, Oh Lord!"

Today, following the development of nuclear and hydrogen bombs, fears have become world-wide. We can hope that the dread will penetrate into military governments and thus protect us from total devastation.

We can discuss what we fear and have feared historically.

Educators need to consider also how we carry this emotion. In some of us, protective fears are moderately upsetting; in others, they tend to affect breathing, heart rate and force, blood pressure, and bowels, producing constipation, diarrhea, colitis, ulcers.

This is because when we evaluate fearfully, the organs we use include those of breathing, of circulation and particularly of digestive apparatus.

Inevitably, the muscle-tube from mouth to stomach is tense in the fearful. This is the esophagus, an organ which literally carries fear. Who has never experienced a "lump in his throat"? Muscles of the stomach and intestines participate in excessive contraction. This is not mere spread of tension, for we employ our viscera when we estimate any danger; indeed when we estimate anything, good or bad, we employ our viscera to evaluate. When we evaluate matters that come up in our lives, we generally make use of our digestive muscles. The muscles mentioned participate in our evaluation, but not exclusively. The digestive tract becomes tense, spastic, with every fear as shown under x-rays. /2/

Every fear at any moment is in part an effort toward self-protection. The fearful always visualize some particular danger, at least at times. In addition to ocular efforts, they tense various muscles as if to solve the problem— to find a way out. They tense repeatedly over the matter. Sometimes these effort-tensions are spent in seeking sympathy and reassurance. Habitual excessive fears concerning one's own health is a nervous state known as "hypochondria". The hypochondriac has an endless search for reassurance. Everytime he receives reassurance, he feels better, but only briefly. Effective treatment is based upon following the instruction, "When you seek reassurance, find the tensions involved and relax them". This lesson takes time to learn. New, healthy habits should replace the neurotic complaints.

Admittedly then, life free from fears is neither normal nor advantageous; but that there can be "too much of a good thing". The over-fearful person generally lives and moves thinking chiefly about himself.

Teachers, we may summarize, should realize that fears are prevalent among themselves, their pupils and their parents. They are among the realities which educators need to consider in their daily duties. Excessive fears can be diminished through progressive relaxation.

NOTES

/1/ Dell Publishing Company, New York, 1971, p. 75.

/2/ Jacobson, E. Biology of Emotions, Charles Thomas, Publisher, 1967; Anxiety and Tension Control, Lippincott, Publisher, 1964.

CHAPTER X

OTHER EMOTIONS IN EDUCATION

A noted psychologist once said that the most effective education is "the cultivation of the emotions and the will, of which the intellect is the servant". G. Stanley Hall based his views largely on questionaires concerning adolescents. What has been done toward carrying out his suggestion? Little or nothing in the school systems of our country.

The control of excessive emotionality is one of the aims of method described in the present text. Recognizing this in March, 1972, an official of the State Education Department of Albany, New York, writes as follows: "Both the philosophy and practice of his method (Jacobson's) for controlling tension seem so appropriate for meeting conditions of our times that we are exploring their inclusion in the health, physical education, and recreation curriculum for adult education programs throughout New York State".

Accurate thinking is a recognized aim in education. As is known, individuals and peoples do not reason clearly and logically during emotional states.

In anger, for example, there are hostile emotions, often with overt action in speech and otherwise. Thinking will be hostile accordingly. If the hostility can be said to be justified, as when a person is being robbed, thinking may be reasonable. Often, however, the case is less clear and thinking during anger evidently is biased rather than logical. If anger is prolonged and becomes habitual, the biased reasoning may be prolonged likewise.

"Wishful thinking" is a phrase of common parlance applied to illogical reasoning when this suits personal purposes. Similarly, we can speak of "angry thinking", "fearful thinking" and other emotional varieties of biased thinking.

Teachers are often confronted with emotional pupils. Accordingly they should be prepared to encounter and recognize many varieties of thinking overriden with emotion.

During strong emotion, individuals give attention chiefly or fully to what stirs them. Figuratively speaking, attention becomes narrowed but sharper. During emotion, fluctuation of eye movements often alternates with focussing. The individual thinks of various matters, real or imagined, then concentrates on one for variable periods.

Emotional bias tends to become habitual, marking character and personality. We see this illustrated among statesmen, politicians, administrators, lawyers, doctors, engineers and members of every profession, trade and occupation.

During the final thirty years of the last century, the bias of businessmen in America and abroad permitted child labor and low wages. This was the era when Engels and Marx assumed that such bias would last forever in all lands of private enterprise. On this bias, they developed theories which underlie the laws of present-day communist nations.

Contrary to the beliefs of Engels and Marx, the wages and political powers of workers in our country have changed immensely since the turn of the century. Child-labor has become against the law of the land. The "full dinner pail", publicized by the Republican Party in favor of McKinley and Roosevelt in 1896, is no longer a mere hope for workers. On the contrary, today union workers have become a power far stronger, relatively speaking, than the laboring class in countries under the rule of the communist party. We discuss here only the role of emotions in thinking, with no plan to compare the merits of democracy based on individual freedom of private property and of other respects. Our discussion is limited to education.

When emotional bias has become habitual in daily life, educators may design long and in vain against it. However, they should promptly recognize the signs thereof in their pupils. One such area in present day school affairs is met among pupils addicted to marijuana and other drugs. It will often be found that their comments and replies to objections to their habits are biased. Their arguments, both subtly and overtly, may favor the drug-use. If parents and teachers oppose, so much the worse may be these persons in the opinions of the habitue! Biased reasoning is characteristic also in addicts. Recognizing this and overcoming it takes time and skill of specialized teachers,whether called "psychiatrists", "counsellors" or any other name. Teachers, like doctors, may be general practitioners or specialists. The present text is written for both.

Aside from emotions control, however, there are many possible approaches to the cultivation of desirable emotions which are beyond the domain of this volume. Esthetic emotions can be developed when pupils are exposed to each of the fine arts. Loyalty to the country and serving the true needs of humanity can be taught in the schools, as often has been done in the past. Loyalty to alma mater and to group effort is commonly taught and learned in school and college sports. Scholastic competition often promotes useful emotion. We could continue at length.

In television, many a feature tends to inspire useful emotions. Stories often indicate rewards for virtuous deeds and punishment for evil. Contrariwise, as is well-known, violence and crime are often illustrated. Many critics believe that this advertises the undesirable and leads to imitation, especially among excitable groups.

These are national problems. Educators need to meet them, realizing the valuable place of appropriate emotions, yet the need to avert emotional imbalance. Tension control training tends to avert imbalance. It cultivates the golden mean between excessive emotion and indifference.

CHAPTER XI

NEW PSYCHOLOGY FOR TEACHERS

Teachers deal with the whole person in daily life, including his purposes. They do not specialize on one particular function. Specialization is for psychologists and physiologists. Yet teachers learn much from these specialists in courses preparatory for the classroom.

Following years of classroom experience, many turn to refresher courses in educational psychology. They realize that every year brings advances. The present chapter is addressed to these ambitious teachers. We shall hope and assume that they will read other present-day reviews as well as this one. Our version of new psychology has developed from our laboratory and clinical teaching experiences of three score years. They promise new advances in psychology for teachers. In addition, we have drawn heavily on the investigations of others.

Every student of elementary psychology has been taught something about sensations, perceptions, associations, images, memory, attention, feeling and emotion. While psychologists differ somewhat in their definitions and uses of these terms, there is fairly general agreement.

In foregoing chapters, we have briefly considered certain educational aspects of attention, memory, feeling and emotion. Now we turn to sensation and perception. We shall indicate what is commonly meant by these terms and go on from there. Sensations are illustrated most often by vision and hearing. Sensory endorgans are stimulated by light waves and air waves. In certain frequencies only, the light waves stimulate rods and cones in the retina. Likewise in certain lower frequencies, air waves stimulate the ear-drums to vibrate.

Once either set of sensory endorgans becomes excited, an extremely complex series of events ensues forthwith. Amazing to say, the excitations of the rods and cones are transformed into code and in this form are conveyed by optic nerve impulses to brain centers of vision and of eye movement. Analogously, the excitations of the tympanic membrane are passed to the endolymph by three little bony transmitters, the maleus, incus and stapes. From the endolymph, the excitations evoke an approprite coding in hair cells, conveyed by impulses in the acoustic nerve to brain centers of audition.

It is generally believed that seeing and hearing as well as all other sensations occur in the brain. However, nobody really has shown this to be true. All we know is that when a sensory brain center is damaged by disease or injury, the sensation specific to that center does not occur. This proves that certain brain-center action is essential for any sensory experience, but does not prove that such action includes all that is needed. Without question, interpretation of sensory codes occurs somewhere in the organism but just where has never yet been established. Indeed, the problem has never been clearly realized by many. Scientists seem generally to believe that decoding occurs in brain centers, including those of vision and hearing. They generally neglect the lack of proof on this subject. However, the author has shown that decoding necessarily depends on muscle tensions variably throughout the whole organism. It is by means of my whole nervous system plus neuromusculature that I perceive and think, not merely in some part thereof alone, such as my brain. Tradition has oversimplified the amazing phenomenon of "decoding" by which we realize the meanings of our sensory experiences.

Signals and meanings, we now suggest, constitute much of the warp and woof of mental processes. This is a new and, we believe, an indispensible view, without which we cannot appreciate the new psychology.

In 1911 at Cornell University, the author began a study on what happens when we understand anything. The stimuli were exposed words and sentences in print. During staring fixedly at print, the subjects reported that the meanings did not persist but came and went. Thus we began to teach them to distinguish sensory processes from the meanings they carry. Observations indicated that the moment when the realization of meaning returned to the subject was marked by some pertinent action on his part. If the word was "cat" and upon fixed it lost meaning for him for an interval, the meaning returned when he began once more to visualize a cat. But this visualization was marked by an eye-movement as if to look at a cat in a particular place or direction.

Obviously, then, in these instances awareness of meaning was an occurence preceded and accompanied by a specific motor phenomenon: the muscular act of looking. Awareness of meaning required participation of the neuromusculature of the subject.

How explain this? It became clearly explained about twenty years later, when at the University of Chicago, I became able to measure the slightest neuromuscular tensions. This was done with the integrating neurovoltmeter, a very sensitive instrument which I was able to invent, thanks to the fortunate aid of the Bell Telephone Laboratories, the greatest electronic specialist in history.

With this instrument it became possible to detect and measure what takes place in the neuromusculature when any person visualizes or engages in any other form of imagery. I showed repeatedly that when we imagine or recall, not only do we have an image, but in order to have an image we look in a particular place or direction where the object is imagined to be. For example, if we imagine a raised hand, the instrument records a movement to fixate or to look in the direction where the hand is imaged. When the raised hand is only imagined, the image, nevertheless, is real. We can believe that visual images occur in the brain. What may surprise some, nevertheless, is that upon imagining or recalling, the process of looking is actually in the eyes and eye-muscles, *not* merely in the brain. Just as surely as we must look in a particular direction to perceive a hand raised near us, so also we must look specifically with our eyes in order to see a raised hand in imagination.

Was this finding unexpected? "Yes" and "No"! I expected it because upon introspection I seemed to detect actual eye movements upon visual and auditory imagination and recall. Certain psychologists also might have suspected it, but they lacked apparatus to test the validity of their suspicion. On the whole, however, the results came as a surprise to the psychological community and have appeared in their textbooks in subsequent years.

Really, however, psychologists generally should not have been surprised; for they had generally believed that visual, auditory and other imagery largely reproduces actual sensory experience. Accordingly they should have remembered that when, for example, a person sees a raised hand, he experiences not only visual sensations thereof but also performs neuromuscular acts to look in a particular place or direction. Accordingly, they should have expected that the reduplication of sensory experience during imagination and recall would actually include reduplication of the specific motor action which is prerequisite for every sensory experience.

We can conclude that since all our sensory experience depends upon muscular adjustments of sense-organs, these inevitably are replicated when we imagine or recall. This has been shown in our measurements repeatedly over the past forty years and has not been questioned by other investigators, many of whom have confirmed our findings so far as their tests carried them. Since all reflection and thinking includes imagery and recall, it goes without saying that all thinking requires the participation of neuromuscular activities in patterns specific to each moment.

Here we return to so-called elementary psychological activities. We have seen that sensations are coded "information" initiated upon stimulation of sensory end-organs. There are twenty or more varieties of human sensations. Accordingly every person possesses and uses twenty or more different coded systems. Nature has developed these systems, including facilities by which at every instant everyone interprets the signals automatically. In plain words, individuals act effectively without knowing how! This is as amazing as it is dramatic, for no instrument manufactured by man can be operated without knowing how. Try to fly a plane, for instance, if you have never received proper instructions! You will not be able to fly it, unless you have learned to recognize the controls! However, nature has provided that to a reasonable extent, even if not expertly, we can run ourselves in terms of the meanings we are familiar with in our everyday experience.

In the final chapters of this book, we shall outline new disciplines for teachers and pupils. We shall recognize meanings in everyday lives, including the classroom. However, our final pages will republish for teachers and pupils improved methods for attention, learning, recall and teaching. These will be based upon principles of design of the human organism, recognizing the controls which Nature has installed but has not taught us to employ consciously as we direct our cars, but by which we behave without knowing how we do it.

Whether we are teachers, or pupils, or anybody else, what we do continually in waking life is to appraise conditions of our existence pertaining to our welfare, so as to act accordingly, which we do more or less successfully. We employ two terms here, which teachers will do well to remember, namely, *appraisal* and *welfare* response, which apply to all human beings.

Appraisal in the sense indicated is the accomplishment of the human mind, continually modified at each moment of living in accordance with changing "information processing".

Here we touch upon the fundamentals of the new psychology. We can explain why they are fundamental by likening them to fundamentals in the laws of physics. When Isaac Newton studied the falling apple, he distinguished force, mass and acceleration. However, he did not regard these three factors as events in themselves, separable from moving objects, but obviously only as features or abstractions from the falling apple.

It is necessary for psychologists to become as clear in their distinctions as was Isaac Newton and his many followers in physics.

Wilhelm Wundt was the distinguished founder of experimental psychology. Even today it is rewarding to read his accounts of psychology and physiological psychology. The same can be said of many other famed classical psychologists of the foregoing century.

However, this should not deter our progress, even though we are obliged to point out an oversight on their part which continues to prevail today. Psychologists have provided excellent studies of sensation, perception, imagery, memory, attention, feeling, emotion and thinking, or at least have made scientific beginnings in most spheres. Unfortunately they have left students with the belief that there are different psychological occurrences at moments of time in the form of sensation, perception, attention, memory, feeling, emotion and thinking, etc. What is missing in this classic view is the realization that there is *one chief psychological act.* As stated, this can be called "appraisal" or by other suitable name. Sensation, perception, attention, memory, feeling, emotion and thinking are not separate psychological processes but features or facets of appraisal. They are abstractions, like the force, matter and acceleration of Newton. Appraisal, we repeat, is the chief act of the human mind. Like the falling apple of Newton, appraisal is concrete and not merely abstract like sensation and attention.

To be useful, psychology needs to be holistic,concrete. In this book, the design is to put psychology to use.

How do the various "elements" of psychology (including sensations and others in the list we have examined) enter into the signals and meanings which constitute our mental lives at each waking moment? As stated, every person continually receives coded signals from his twenty or more sensory systems, known as sensations. At any moment many of these are automatically neglected while some others are automatically taken into account. Thus the individual knows where he is and the time, however approximately. Signals refer to conditions within as well as external to the organism. Certain signals tend to become paramount, such as those of pain and those which indicate danger. In general, at each instant of time what our minds do is to provide orientation and the meanings of what is going on within and external to our bodies. As stated, each individual interprets at each moment of time, but interpretation is in continual development and flux. Often the interpretations of any individual are influenced by others in his vicinity. Trotter wrote about mob psychology. /1/

Every moment of appraisal is subject to error. The individual may be wrong as well as right for his welfare. Failures may be partial as well as success.

Attention obviously is a feature in the total act of appraisal. Likewise memory, feeling and emotion always participate. An appraisal may be wishful, angry, loving, embarrassed, hateful or may be marked by any other emotional feature. It is never pure thought, without emotion.

However, as in mathematical calculation, rational processes may predominate.

The human mind is the representative function of the body. Mental activity is appraisal, intellectual, emotional and practical, in combination. Motivation, like emotion, also enters into appraisal. There is meaning in the sense of gain, however signalled. (We should remember to distinguish signals from meanings and vice versa in all psychology.) Accordingly the motivation (which is a variety of meaning) will be signalled always specifically and realized by the individual, however vaguely.

Is our explanation of the human mind complex? Yes; but only in so far as the mind itself presents complexity. We regard the human mind as a function of the human organism, more or less synchronous with other functions, including digestion and circulation. These likewise are complex functions requiring volumes to describe even briefly.

What the mind does at any instant in any individual is by no means unrelated to his systems of digestion, circulation and endocrene secretion. The mind and body are one living entity. We can think of them separately, but such thinking is never wholly correct.

For examples, when a pupil, teacher or other individual is overtense in his musculature, his digestion and circulation as well as his mental activity are affected. He will think differently, feel differently, emote differently, appraise differently.

Every teacher should know this. Accordingly we present this chapter. We have seen that slight, unnoticed ocular and other muscular tensions participate in all types of mental activities, necessarily including those in teaching and in learning. In the final chapters we shall teach self-control for better results in learning and teaching. The tensions which students must learn to recognize for better results in education include those of the eyes and speech in thinking. These are very slight in intensity and quick to disappear. Accordingly, the ambitious individual who seeks to learn to control his mental activity for increased efficiency needs to become a good observer. The project will be interesting and technical; thus all the more rewarding.

NOTES

/1/ Trotter, William: Instincts of the Herd in Peace and War, N. Y., McMillan, 1920.

CHAPTER XII

OVERTENSE PUPILS

Turbulent times breed overtense pupils. /1/ In consequence, problems arise for teachers and parents.

In moderation, tensions are normal, for they are largely what are popularly known as our efforts. Our efforts carry our purposes and healthy lives always include purposes, some changing, some temporary, some lasting. In every stage of existence tension is normal and healthy provided that it is neither excessive, as in nervous states, or insufficient, as in apathy or lethargy or laziness.

Since everybody is and should be more or less tense, rather than apathetic, we ought to choose our words accordingly. When we call a person "tense", we really mean excessively tense. This wording has misled many to regard "tension" as an evil, which it is not when in moderation.

In common parlance, the term "tense" thus is often used ambiguously. Nevertheless many will correctly interpret the word from the context. For them, accordingly, the present chapter might have been entitled, "Tense Pupils". They would have understood this to mean, "Overtense Pupils".

Efforts of infants generally come and go within brief intervals, as they grasp with their hands, look here and there and quickly move their little bodies. Upon aging of months and years, there is noticeable increase in duration, direction and organization of efforts.

What really are efforts? They are patterns of muscular contractions, slight or marked, brief or sustained, in the one thousand thirty skeletal muscles (approximately) of the human body.

These patterns have a familiar feel to all of us in daily life as in grasping, walking, running, eating and drinking. What is not familiar is their continual occurrence and recurrence when the muscle contractions are not grossly visible or are not easy to follow with the naked eye. It may come as a surprise to many that precisely these patterns constitute our mental activities on the peripheral side, a fact not yet stated in most textbooks.

People, like animals, successfully engage in many natural acts without understanding how they perform them. So we walk, run and jump, attend, study, enjoy ourselves. Imagine a pigmy in Africa licking oil off palm leaves: obviously the pigmy does not understand his own performance. Commonly we share a like ignorance in everything we personally do, unless we become scientific specialists in human action. Our mental activities are mysteries to us, being performed naturally, thus without our observing the slight tensions and images therein. However, our sensory systems, our feelings and emotions are familiar experiences. They are part of the experience of self-consciousness,in everyone. They are part and parcel of the continual awareness of self. Accordingly our continual patterns of neuromuscular tensions both in our behavior and mental activities, while not recognized as such, nevertheless are normal subjective experiences in everyone. Since we adults thus behave and think without being aware of the tensions and images employed by us, we can be confident that our children behave and think likewise unaware how they do so. Thus everyone, young and old, spends his energies without realization,unless trained to keep account.

Children literally have energy to burn! They are highly mobile. Equal mobility in adults would be striking restlessness. Accordingly it may be difficult to decide which ones in a group of active children are ultratense.

The most direct way to estimate tension is to observe the person closely for signs of steady and intermittent contraction. Does he wrinkle his forehead? If so, does this occur steadily or intermittently? What about frowning and blinking? Do his eyes focus in one direction when he should be giving attention or do they fluctuate? Does he fidget with his whole body or parts? Does he play with a pencil, cigarette or other handy object? Does he stammer, stutter, talk too much or too fast? Does his voice seem elevated, shrill? Does he gulp his food at meals? Does he remain silent, shy, embarrassed?

What then are common signs of overtension in pupils? Overaction is one; restlessness, another; failure to sit still and to stand still; rapid movements, even when inappropriate; rapid speech, sometimes inarticulate; high pitch; failure to listen intently; unusual wrinkling, frowning and eye-movements, often at times when the gaze should be fixed in attention; unruliness, with excessive whispering, passing notes and playing in class. When the teacher becomes interested in signs of overtension, he will add many others to the list given above.

Today teachers need to be on the alert for signs of drug experimentation and addiction. Their suspicions may be aroused upon failure of a hitherto good student to keep up his customary attendance and grades. Teachers may notice signs of inattention, lack of interest, excessive quietness, dreamy conduct. In short, the pupil evidently becomes distracted from serious work. Overheard may be foul language. Advanced cases often speak profanely and openly on sexual matters. Evidently current addiction even to hashish breeds contempt of the mores of parents and teachers. The result even after this "milder" drug often is mental aberration of abusive types. We shall leave to psychiatrists who specialize in drug addiction the hoped-for solution of what the President of the United States has branded a menace to the continued existence of this country.

Excessive tension renders people less teachable. Accordingly in estimating tension states in highly active children, teachers are in an advantageous position. The child who is both highly active and hard to teach often is particularly tense much of the time. High chronic tension in most muscles is to be expected and will be manifested in slowed relaxation time. A quick check can be accomplished by the teacher by requesting pupils at their desks to close their eyes and relax for several minutes. The ultratense may then manifest outstanding restlessness.

Another sign of high tension level is failure to pay attention. However, the sign is far from infallible, for different pupils will vary in sustaining attention according to their interest at the moment and according to the distractions then present, such as other children whispering and playing. In addition, pupils at all ages will tend to vary in paying attention according to habits developed in past schooling. When signs of increasing tension appear upon reading, listening or other occupations, the observant teacher may be led to investigate the vision and hearing of the pupil and to search for other causes of retardation. Finally, the teacher must question the procedures he employs toward sustaining attention, asking himself how effective they really are.

Admittedly, teaching is an art rather than a science, with each teacher employing methods different from those of other teachers. No two teachers will teach even the same subject quite alike, for all people are individually different, like their thumbprints. Nevertheless we can assume that teaching principles employed by anyone may be largely successful or unsuccessful. Often the introduction of tension control teaching may make the difference between failure and success. In a later chapter we shall relate of a class of underprivileged children in a public school completely intractible until they were briefly trained to be less tense (page). Elsewhere we shall relate of methods to reduce the overtension in stammerers and stutterers (page 71).

Overtense pupils tend to be distracted and fatigued. Their attention is dulled to their studies. They are more prone to engage in playful pursuits at times when they should be at work. Accordingly a course in tension control is clearly indicated; brief, if need be, thorough, if time permits.

NOTES

/1/ Readers are referred to YOU MUST RELAX, by Jacobson, E., 4th Ed. 1957, McGraw-Hill Book Co., New York.

CHAPTER XIII

SEX EDUCATION

For and Against

Today the press, television and radio stir public interest with conflicting views on sex education in our schools. Most vociferous and influential are those who stress the "importance" of children and adults knowing all. Since the controversies have to do with the very bases of Western culture, we can not afford to ignore them.

What is striking on both sides of most arguments is the earnestness and conviction of the opponents. We are reminded of heated arguments over religion prevalent in by-gone days. Then as now many facets were ignored.

To be sure there are many and various facets to the subject of sex, rather than merely one or another point of view. Speakers and writers obviously should take these into account if they are to present well-ordered, judicial opinions and suggestions. In the present text, we shall sketch the absence of these qualifications in most publicists today.

Nevertheless, the author will refrain from expressing his own views for or against full sex education. This would be out of place, for we shall leave to our readers to formulate their own views. In this chapter as in previous ones the aim of the present text is restricted to improved methods in education. Thereby we can expect educators to be better prepared to decide what is best for their pupils.

Advocates of unrestricted sex education unawaredly ignore much of the history of Western races. They tend to assume that various features of sex life should be fully aired so as to abolish ignorance. They ignore the adage, "Where ignorance is bliss, 'tis folly to be wise!"

This adage might seem to them weakness in preparation for modern life, when the "pill" is in the purse of many girls in college, high school and even lower grades.

However, there was a day when our girls lacked present facilities for sleeping with boys. Was the innocence of bygone times merely ignorance? Or did their faces and manners indicate a certain beauty which innocence alone can portray? Does the "pill" conduce to sexual morality or is this valueless? Once attention is called to these questions, it seems obvious that they should not be ignored by advocates of complete sexual education for youth and adults.

Should our youth as well as we ourselves be taught all aspects of sexual topics, including masturbation? Should this knowledge be merely theoretical or should our youth make it real through daily practices? Information on something to be done, as we all know, incites action in many to experiment and to experience. This applies, as we also know, to vivid descriptions of crime and of suicide in the newspapers.

Many of our male youth masturbate excessively at night, depleting their energies for other accomplishments. This is not commonly stated by advocates of complete sex education. Possibly increased masturbation among the populace has resulted from increased attention following teaching of Sigmund Freud that masturbation is normal for children four or five years of age. Statistics are not available to prove or disprove Freud's allegations. Freud taught that masturbation, conscious or "unconscious", is a biological stage in the development of sexuality. We can only comment that many of Freud's theories have been accepted as gospel facts by his many followers, taught to patients, and promulgated in the literature of psychiatry, sociology, drama and fiction. It is safe to say that the teachings of Freud promoting interest in masturbation and sex have exerted wide popular influence on Western culture, although statistics are of course lacking.

Widely publicized also have been the "statistics" of Alfred Kinsey. Little noticed in his writings were his comments on homosexuality, which he did not appear wholly to frown upon. Again, we can not properly estimate what has been his influence on modern, would-be sex educators. Evidently, however, his writings have increased attention to sexual matters through widespread publicity.

Since the aim of the present text is not to enter controversies but to sketch pertinent issues, some overlooked, others not, we refer now to venereal infections abated for a time through the use of penicillin but again on the increase due to the organisms becoming resistant to this drug. Advocates of sex education as opposed to permitting continued sex innocence have a well-known argument. Males need to be forewarned lest they contract venereal disease unawares and so also those females who use the "pill" to permit sleeping with male associates free from dangers of conception. This argument seems generally accepted.

Increased freedom for intercourse among females can be variously appraised. A recent (1971) quotation from a Chinese publication evidently indicated an adverse appraisal of many American females, regarding them as *"prostitutes"*. Evidently the common use of "pills" by the unmarried scarcely meets the approval of many Chinese.

Sex education needs to be considered also in the light of the moral and religious history of Western peoples. Monogamy certainly has some advantages at least. Children are benefitted through rearing by parents devoted to each other. Does free sexual intercourse before marriage contribute toward such devotion? This question needs to be considered at length. Those who decry the Victorian age when it was indiscreet socially to mention even "toes" nevertheless need to become aware of the possible usefulness of Victorian inhibitions. As related in Chapter 4, inhibitions play a necessary role in social order, no less than in law, physiology and psychology. They are not the superfluities which, knowingly or not, Freud led his followers to believe.

We inherit a social order with a history of sexual inhibitions derived from the experiences of the ancient Hebrews, as set forth in the Old Testament and other writings and further developed by followers of the Catholic and Protestant religions. Debaters need to consider whether our culture will thrive if religious lessons of the past are thrown aside. They will need to recall the plight of Sodom and Gemorrah. They may ask themselves, "Are we approaching low moral levels without realizing it?"

Advocates of innocence can point out the beauty of love without passion and the felicities of selfless devotion. Also they can argue that sex education often leads to pornography. They can add that analysis of sexual matters can lead to over-attention and even to sexual hypochondria.

In answer, proponents of sexual education for everybody will argue that ignorance is weakness in preparation for life. Youngsters need information, they contend.

We can leave to our readers, whether there is not a middle road, a golden mean, which needs to be pointed out and developed for the benefit of our Western cultures and their survival.

CHAPTER XIV

WHEN YOUNGSTERS TAKE DRUGS

One of the great tragedies of the present day is youthful addiction to drugs. In countless families devoted parents are asking themselves, "What have we done, what have we omitted, that has brought this misery upon us?" Those of us interested in the welfare of our nation may well ask, "How can the plague be controlled?" Many will answer despondently that any vice once established may prove difficult or impossible to eradicate. History affords many such examples. Even temptations like the overuse of alcohol and tobacco appear to be with us to stay. The first is responsible for many deaths per year according to accident statistics on drunken drivers. The second appears responsible for many annual deaths chiefly from cancer. There is no defense against these tragic consequences.

Otherwise, however, the use of alcohol in moderation and even of cigarettes can be shown to have amenities. As compared with drugs, alcohol is chemically less objectionable to our tissues. Alcohol is broken up in the body into water and carbon dioxide, harmless chemicals which our tissues can take care of readily. People have become accustomed to effects of alcohol, used in moderation, for countless centuries. History has shown that vigor and initiative in a population does not succumb to the moderate use of alcohol. No such history defends the use of opium, for example, in China. Generalized use of this devastating drug evidently has partially paralyzed the productive energies of this great people.

Cigarettes can cause lung cancers, as stated, which occur tragically in many families. Never, however, have the evil effects of smoking, even in excess, attained the magnitude of menacing the future of our people or of any other people. We can condemn the evil without exaggerating its consequences.

No such reassurance is justified concerning the possible survival of our civilization if the use of marijuana (hashish), heroin, amphetamines and other forms of addiction continue on a nationwide scale. We cannot afford to be pessimistic. Neither does the indifference of optimism lead to a practical solution.

Unfortunately, there are many doctors and laymen relatively blind to the menace of drug addiction. They tell us, for example, "Marijuana is harmless! Don't worry about it!" Don't worry when your child of twelve or fifteen loses interest in studies and his own future? Just ignore it? Intelligent people will understand that even such doctors may be too preoccupied to think clearly of consequences. Or too bromidic!

In the present volume on education, our task is limited to description of conditions which exist among learners and teachers. We do not seek to solve the problems of drug addiction, but to state them in so far as they concern education.

It is germaine, however, to include some fundamental points regarding the use of drugs in so far as teachers are confronted by pupils who "experiment" or who become addicts.

We can emphasize that such pupils characteristically manifest unclear, illogical thinking about the drugs they use and their effects. Their thinking is biased in favor of drug use. On this topic, however reasonable otherwise, they tend to develop habits of wishful thinking without realizing this.

The same pupils show a variety of mixed emotions not compatible with devotion to studies. That hard work and sacrifice are useful virtues in the struggle for existence and that this struggle promotes the development of character are truths unacceptable to most drug addicts, whether children or adults.

"What is the use?" they sometimes ask.

Teachers and parents will do well to consider their query in the context of their drug-addicted lives. Answering their question should be deferred until their reason for asking it has been exposed. What is their motive in depreciating healthy living? Obviously, they are arguing in favor of their use of "trips" and getting "stoned". Obviously, also, they are not aware that they are carrying on an *argument* with parents, teachers, and doctors.

They need to be made aware of this, either by discussion, which will take time, or by dramatic means. One psychiatrist exposed young, argumentative addicts to the sight of an older patient-addict while being subjected to electric shocks and convulsive symptoms. The effect was dramatic.

Clearly, the possible useful approaches are many. They should always include educating the victim to realize his wishful thinking in defense of his habits. They should likewise include helpful suggestions that his abilities will not be permanently impaired, once he has given up the drugs permanently.

These things said and called to the attention of parents, teachers and specialists, we shall leave to the latter the complexities of breaking the habits of drug addiction and reeducating the unfortunates who have fallen by the wayside.

CHAPTER XV

CURRENT COURSES IN TENSION CONTROL

College-High School-Grades-Preschool

Courses in progressive relaxation began to appear in college curricula about forty years ago. Since then their number has increased extensively. Stephens, Wellesley and Barnard were among the first colleges. In the latter, Professor Josephine Rathbone taught prospective teachers over several decades.

"Everybody wants to learn to relax" was stated by Dean Lange, Editor of the University of Chicago Press, which published PROGRESSIVE RELAXATION in 1929 (revised edition 1938). The need of the therapy in heart and blood pressure disorders was stressed by the Metropolitan Life Insurance Company. Thus, in the course of years, "relax" became a popular word.

In 1925, when Arthur Steinhaus was a graduate student at the University of Chicago, he was trained to relax by the present author. Impressed by the benefits in his own daily life and in general education, he devoted the later years of his brilliant career to teaching the subject at George Williams College, Michigan State University and other institutions, abroad as well as in the United States. Using our integrating neurovoltmeter, he offered proof that his pupils really learned to relax. (See Table 1, page **145** .)

Presently at George Williams College, courses for college students and others for prospective teachers of tension control are given by Professor Jeanne Norris. At the University of Iowa, in the Department of Physical Education headed by Professor Gladys Scott, courses are offered by Dr. Margaret Fox. Professor Bruce Frederick continues to teach in the field at Wisconsin State University. A highly qualified instructor of elementary teachers at Michigan State University is Mr. Michael Marshall, who is also a baseball player in the "Cubs Team".

In 1970, the National Broadcasting Company requested the author to broadcast on tension control for public education. The course consisted of ten weekly appearances with a model for illustrating how to observe tensions and how to practice daily.

Public education in tension control has been one of the chief objectives of the Foundation for Scientific Relaxation, incorporated not for profit. For years, until her retirement in 1969, the educational department was directed by Bernadine Lufkin. In a circular entitled, "Tension Control in Public Schools", she related of early teaching methods as follows:

"It is becoming clear that high nervous and muscular tension is far too common in people of all ages and types, in every social and economic class—even among well-trained athletes. Big-league baseball players are not immune. Almost anyone may tighten in the wrong places at the worst possible time, as in a competitive game, or a scholastic test. As muscles tense, emotions are keyed up; dry mouth, nausea, or even panic may result, with disastrous effects.

"Habitually overtense persons often fail to realize just where and how much their muscles are involved. Distracted by unpleasant mental and physical sensations, they may not even try to relax—or trying can make matters worse. Severe illness may ensue.

"Delicate electrical instruments have shown that when subjects in average good health are asked to lie quietly on a couch and relax, muscles usually keep on contracting over the body, as if they were doing hard work. Yet effective methods of relaxing nerves and muscles are well known and widely used".

"For many years, scientific relaxation was taught mainly to relieve tension that caused actual disease, such as nervous breakdown, high blood pressure, peptic ulcer, and other gastrointestinal complaints. Nevertheless, it was known that healthy persons also benefit when unnecessary efforts are reduced. Training can be given at any time from early childhood to old age. Moreover, as a general rule, the younger and healthier the pupil, the more quickly he will respond".

"The pilot nonmedical project was a course of eight lessons started at Beloit College in February 1960. Even before the end, in this and later classes, students noticed they were sleeping better, worrying less, and getting more work done, though using less effort than before. A few believed that training had raised some college grades. Several discovered that difficult tests or examinations no longer frightened them when they found and relaxed particularly tight muscles, for instance, in the chest or back of the neck".

"Several physical educators then asked for a teachers' course, which was offered the following November. It was conducted at the George Williams College Camp by Foundation and College staff. Almost forty teachers attended, including many department heads from colleges, universities, and YMCA branches. Each was asked to teach a class in his own neighborhood. They returned for a final meeting in February 1961, and all reported gratifying results, with 'high student acceptance'.

"A number of similar courses have been offered since. By August 1964 about 140 teachers of tension control had been trained in the United States. Scientific Relaxation is now offered at three normal schools, including the University of London, England. It is taught extensively for natural childbirth. In Chicago, both Central and Lawson YMCA branches give day or evening courses in adult education. Two U. S. colleges and a Canadian university are doing research in this field with electronic apparatus".

"Relaxation was started in Chicago Heights by a physical education coordinator in School District 170, Cosmo A. Cosentino. In the fall of 1961, he took a teachers' course in Chicago and immediately adapted the basic principles to his classes. His new methods were extraordinarily simple.

Children were first shown how to relax while lying on the gymnasium floor. Practically the same technic could be applied in the schoolroom, with children resting arms on the desk and laying the head on one arm.

"Several instructors in lower grades found that a five or ten minute period of thorough relaxation was remarkably refreshing when the class was extremely tired. It also had a soothing effect on restless, excitable groups.

"Most appreciative were the special instructors. They noted that tension control had great value for pupils who were handicapped in various ways, for example, by retarded minds, poor eyesight, or emotional problems. A typical comment was, "They can't do without it", once the method had been learned.

"An especially encouraging and detailed report was offered by Mrs. Frieda Whibby, who had taught emotionally disturbed classes for many years. She had an unusually difficult group of intelligent boys and girls six or seven years old. In spite of a fairly good social and economic background, all had good reasons for being upset, for instance, parental neglect.

"The usual methods of training such a group were tried for several months, but with little or no success. As a last resort, tension control was begun; it proved so effective that it was adopted as a regular part of the day's routine. Pupils relaxed at their desks for a few minutes in the morning, and also when they returned after the noon break, the time of greatest fatigue. Children were also quieted by relaxation whenever they were upset by special problems in the classroom. Behavior improved, and first grade work was satisfactorily completed.

"The good results obtained by relaxation in Chicago Heights prompted the Foundation to consider a methodical trial. Mr. Cosentino and Mrs. Whibby were consulted about wider application of their adapted technics. It was decided that kindergarten was the best place to start a project, as relaxation could be taught in the regular rest period, using no extra time".

"Four briefing periods of about an hour each were given to three teachers who offered their help. Mr. Cosentino and a Foundation instructor met with them once a week after school in the afternoon. They were shown how to relax their own muscles in the usual way for adults. In addition, two children were brought to one meeting to demonstrate class methods.

"Teachers were asked to notice once a week the numbers of pupils who were relaxed or tense during the rest period. A fourth instructor, who took no lessons, agreed to keep a similar record for her untrained boys and girls.

"Results of tension control were reviewed late in January 1964. Judging from the simple charts, classes that were taught to relax became quieter during the regular rest period. As weeks went by, the untrained group became more fidgety and excited, especially near Thanksgiving and Christmas holidays. On the whole, trained classes were not only calmer and better behaved, but more alert and capable in ordinary school lessons and activities, than would be expected of the average group.

"Accordingly, other kindergarten teachers in the district were invited to join the project, and the four-lesson briefing course was repeated. Ten instructors attended, including the four who carried out the first stage of the research plan. (Also present were the school nurse, a psychologist-intern, and a speech therapist.)

"The enlarged kindergarten group had equally good results. The original three instructors continued to have the trained classes relax and noticed further improvement; they also taught their second class. The fourth teacher, who had only observed, now introduced tension control. All four took the second course chiefly to increase their own muscular skill, which of course would also help in teaching others.

"Over-all results were again summarized toward the end of the term. Without exception, all teachers in the project recommended addition of tension control to the standard kindergarten program. Several also emphasized that the subject should be continued throught the grades, with more advanced training for older classes".

"The methods used in showing kindergarten teachers and their pupils how to relax were alike in basic principles. Both consisted essentially of requesting the group to (1) lie or sit in a comfortable position, with the body well supported, (2) close the eyes, and (3) let specific parts go limp, with or without preliminary contraction that showed what *not* to do. Time was allowed for relaxation to deepen, or "progress", considerably beyond the first attempt to let go. When an adult or child is well relaxed, he is very quiet and, as a rule, eventually falls asleep. This can happen rather abruptly with small boys and girls—almost as if to stop looking and moving about were to stop thinking, in a few minutes or even seconds.

"*The Teachers' Course* of relaxation, though much abbreviated for the busy faculty in Chicago Heights, was essentially the same as that first described by Dr. Edmund Jacobson for doctors and their patients".

"The simplest equipment for informal instruction is a room with reasonably comfortable chairs. After a short rest, gradually closing the eyes, pupils are asked to perform an act that employs a single group of muscles, for instance, to bend back the left hand at the wrist, or to bend the arm at the elbow. As they respond, they should try to locate the active muscle group by the slight feeling of tenseness, respectively, in the upper, outer part of the forearm or in the biceps. This tight feeling is very important because it indicates just where and how much the voluntary muscles are contracting. The class is then asked to stop bending, and to notice whether the tense feeling disappears. It is called the control sensation, or control signal, because it guides muscular activity.

"Most of the lesson period is spent in practice of relaxation, and home drill is also advised. By economizing on practice time, the major voluntary muscles of the body can be introduced, one group at a time, even in a four-hour course. Once recognized, they can be reviewed by a pupil during work or rest, until it becomes a habit to notice and relax superfluous effort, practically without thinking about it.

"*Kindergarten Children's Training*, as already stated, consists of radically simplified technic. Instead of learning to relax separate muscle groups one after another, as in most adult courses, they are only taught to be generally limp, particularly in arms and legs. Preliminary contraction of different muscle groups is omitted, and the control signal is not mentioned.

"*Class Teaching: The basic positions* of the body for lessons and outside practice should avoid the distraction of unnecessary twist, stretch, and pressure. Whether lying down or sitting up, the pupil should be so well supported that he is fairly comfortable and, once settled and familiar with the new position, is not inclined to move. Crossing the arms, knees, or feet is taboo.

"Kindergarten children usually lie on the floor, each on his customary small blanket or mat. The body is practically straight, with feet slightly apart and arms not touching the sides. Without a pillow, the head may roll slightly to left or right for better support. This supine position can readily be taken on any flat surface, such as the bare floor of a gymnasium or at home on a bed or a plastic or canvas cot.

"Sitting position can also be introduced in kindergarten, for example, if the floor is too cold to lie on, or the teacher wants to prepare the class for relaxing at a desk in the first grade. In the grades, arms are laid on the desk, and one arm is crooked to support the head, which rests on one side with the back of the head toward the elbow joint. The other arm lies free, touching only the desk. Feet are flat on the floor and slightly separated. In kindergarten the class can take the same position at their regular tables.

"*Instructions* begin with asking the group to get their blankets and lie down quietly, without crowding each other. Position is explained. Children are then requested to close their eyes, and to let go completely at wrists and ankles, like rag dolls. If they talk, move about, or take the wrong position, they are corrected. Some teachers assign a special place to each child for the daily rest. Those who play with neighbors or interrupt their rest can be moved.

"The teacher watches closely for repeated restless motion, and for signs of rigidity. She may also test the joints for stiffness. For example, the arm lying freely on the table or floor is lifted slightly at the wrist, then dropped; it should hang limply and fall like a dead weight. A stiff wrist may be limbered by a little shake, with the instructor's hand grasping the lower part of the forearm, while the pupil is reminded to let go of his hand.

"The ankle too should be flexible, letting the foot turn as readily as if equipped with ball bearings. Stiffness in lying position is indicated by toes pointing straight up towards the ceiling. As relaxation proceeds, both feet tip outward, resting on the heels. To eliminate rigidity, the instructor may tap sharply on the inner side of the forefoot, to push it outward and down, telling the child again to go limp. When ankles are fully relaxed, feet lie on their outer edges with heels fairly close together and soles in a single straight line, toes pointing right and left, respectively.

"However, loose wrist and ankle joints are merely the start. Once achieved, relaxation spreads to involve not only the forearm and lower leg but the upper parts of all limbs, and also the trunk, neck, and head, if time is allowed.

"*Practice periods* differ in length. Beginning with short trials of only a minute or two, they are gradually increased to five minutes. As a rule, most of the class learns to rest quietly for this length of time. The teacher can then employ longer or shorter rest periods as needed. Some allow a few tired pupils to sleep soundly for ten minutes or more, perhaps longer than their classmates. When children are overexcited or upset, they are easily calmed by impromptu relaxation. At times, they may ask for it themselves. Home practice is recommended, and for particularly interested parents, methods can be explained.

"*Problem children or classes* are generally managed by the standard rules but need far more time and patience. Trouble may arise from a poor social and economic background, family conflict, mental or physical disability, or other reasons. For example, a youngster who flies into tantrums, or constantly fidgets, or stammers, or has a facial twitch is bound to be slow in learning to control his tensions.

"Above all, teachers should not blame themselves in refractory cases. Slow progress from day to day may seem like no progress; yet over and over again, after discouraging weeks or months, teachers declare that real improvement is unmistakable. And the satisfaction of helping these difficult boys and girls more than makes up for the effort involved.'

"*Rest, relaxation and sleep* during the lesson are related in ways that may confuse an inexperienced relaxation instructor. However, much can be explained by electrical tracings that have shown exactly what the muscles are doing under various conditions.

"A person who can lie fairly still may conclude that he is resting, but if the voltmeter indicates high muscular tension, he is actually at work. If high tension is a habit, he will probably stay tense when he falls asleep at night; sleep is likely to be restless and full of dreams, and he will often awaken feeling tired rather than refreshed.

"Muscular relaxation quiets physical, mental and emotional activity; sound grows dim, colors fade, even pain may disappear. During advanced relaxation, a pupil may still be awake, but resting far more than if he were asleep and tense. However, if he can remain so completely relaxed that all thinking stops for a short time, he will fall asleep.

"A relaxation teacher without electronic guidance can judge her pupil chiefly by *lack of activity;* this is shown by slow response to request, limpness, and a blank face, especially by slack muscles about the eyes and mouth. Though many kindergarten children fall asleep during the rest period, those on or near the borderline can be almost equally relaxed, and benefit quite as much, since they too are practicing muscular control.

"*The value of kindergarten methods* lies in their simple, practical approach to a skill that can be subtle and complex in later years. For his contribution, Mr. Cosentino deserves greatest credit. Technic can be demonstrated in the gymnasium and tried out on the floor by an entire class in two minutes. Any kindergarten or primary teacher can adapt it either to a floor or to a standard kindergarten table or classroom desk.

"It should provide a quick but useful rest period for school children not only in kindergarten but throughout the first six grades. Moreover, it would be a good foundation for more thorough, specific, localized muscular control, which could be introduced by degrees at elementary and higher school level. As one far-sighted instructor commented, 'If this is continued consistently, these children will acquire an invaluable asset for life'*.

CHAPTER XVI

QUESTIONS AND ANSWERS

What is TENSION?
Tension is shortening of muscle fibers.

Is this work?
Yes.

What is another name for muscle tension?
Contraction.

What do our muscles look like?
They look like the red meat we eat, for this is muscle.

What is RELAXATION?
Relaxation is lengthening of muscle fibers.

Is this the correct sense of the word?
Yes.

What is an incorrect usage?
Laymen, including authors, often apply the term to amusement and "recreation".

Is playing golf a way to relax?
No. The tensions of playing golf often are severe enough to bring on heart attacks in susceptible players.

Does playing a musical instrument relax you?

No. Playing consists of tension patterns required to create music.

Does listening to music on the radio relax?

No. This is a common misbelief.

Is learning to relax aided by turning on the radio?

No. This is wrong procedure.

Can tension be felt?

Always.

Do people know when they are tense?

Seldom, unless trained to observe.

How can a person recognize tension?

By contracting some group of muscles, for instance, those which bend back the left hand, while noticing the sensation in the upper portion of the left forearm. See Figure 1.

What is another name for the sensation of tension in muscles?

Another name is "the signal of tension".

Can one learn to recognize this sensation or signal?

Yes, with practice.

Even when the contraction is very slight and the signal is very faint?

Yes, with practice.

What is the purpose of learning this?

Once the skill of recognition has become habitual, one can recognize what muscles are tense at any moment.

Why should we learn to recognize muscle tensions?
To save energy.

Is this as important as saving money?
Yes; more so.

Why save energy?
To avoid fatigue, for one thing.

Are there other reasons?
Yes. Energy saved is energy gained. The energies saved become available for purposes of life, not only for work, but also for play.

Is this efficiency?
Yes.

Are efficient persons always serious?
No. They may have energy available for fun.

Do muscles resemble wheels in any respect?
Yes. Vehicles move because wheels turn. People move because muscles contract and relax.

What substance is used in automobiles to supply energy?
Gasoline.

What corresponds in man and higher animals to supply energy?
Adenosine triphosphate.

Can we buy and use adenosine triphosphate as we buy gasoline?
No. We must manufacture it internally.

How?

Nature has supplied each living creature with a chemical laboratory of its own to care for many needs.

Does relaxation require the burning of adenosine triphosphate in muscles?

Yes.

Should we make efforts to relax?

No.

Why not?

Efforts are muscular tensions. Unless trained to relax, people make efforts to relax. This is failure.

Is there a name for efforts to relax?

Yes. It is called "the beginner's error".

Is saving of energy comparable with thrift in business?

Yes.

How?

To run any business successfully owners need to take into account costs vs. income. Otherwise failure results, as occurred in the Rolls Royce and the Penn-Central companies. For security in daily living likewise, we need to take into account our effort-tension expenditures lest they exceed our energy resources.

What is mental work?

It is effort to represent and appraise.

What is the source of energy?

Adenosine triphosphate. This is the chief fuel used for the brain activities, the nerve impulses and the neuromuscular patterns of contraction and relaxation, which, as we have described in Chapter XX, comprise the energetic side of mental activity.

Do mental activities have any feature other than the energetic cost?

Yes. Mental activity consists of (1) signals, which are energetic like telegraph signals and (2) of meanings which correspond with telegraph messages. See Chapter XX.

Is mental work required to relax?

No. To relax is to discontinue mental work.

Is effort required to observe signals of tension?

Yes, especially at first.

Does effort in this observation diminish with repetition of observation in daily practice?

Yes. Upon repetition of observation or of any other act, the act tends to require less and less energy cost.

What name do we give to acts repeated until they become more or less automatic?

They are called "habits".

Why are habits of being relaxed good for us?

They save our energy automatically.

To learn to be habitually relaxed, should we concentrate on our muscles?

No. This is wrong. Some writers on relaxation advise such concentration, showing that they have not mastered the principles of scientific relaxation.

Is concentration relaxing?

No. On the contrary, it is effort. Concentration on muscles is effort to relax, which is failure.

Does observing tension require effort?

Yes, but only slight. In learning to dance, at first you may watch your knees, but when you become adept, you no longer need to do so.

Just how can I relax without effort?

Bend back your left hand, noting the signal of tension in the upper portion of the left forearm. *This is you doing.* This is *effort.* Now discontinue the effort. All you need for this is to go negative.

If I put my hand down, is this relaxing?

No; quite the contrary! This is effort to replace your hand where it was before the bending.

Why is replacement not relaxing?

Because it is tensing the muscles of the lower section of the forearm. These contract when you bend your hand forward. See Figure 2.

What then do I do to relax my forearm when I am bending my hand back as in Figure 1?

You do nothing positive. Just cease to make any effort and the hand will fall of its own weight.

What if someone prevented my hand from falling by restraining it? Could I relax then, even if my hand were prevented from falling?

Yes. The weight of your hand would then rest on whatever restrained it from falling.

What should I be thinking of, what should I do with my mind when lying down to relax?

Your question is wrong. Only one basic instruction is given in teaching to relax: go negative! You are shown how to do this. It does not require "putting your mind on relaxation". This would be effort to relax, which is wrong.

Should I be thinking of something pleasant?

No. See the answer given above. When walking, you do not find it necessary to concentrate on your legs. So in relaxation what is required is repetition until a habit is developed. A skilled relaxer does not direct his thought on relaxation but relaxes automatically.

Should I try to stop thinking?

No. An effort to stop thinking would be tension. As stated previously, you are to relax the parts on which you have received instruction up to date. You are not requested to think or to stop thinking. As you learn to relax muscles, the answer will become evident.

What do I do when relaxing if part of my arm begins to tingle from "falling asleep"?

This trouble is misnamed, since it arises from a position of the elbow such that the ulnar nerve is pressed upon and flattened slightly for the moment. Thereupon control of muscles supplied by this nerve is no longer completely possible. Accordingly it becomes necessary to discontinue relaxing the arm but to bend it ulnarwards as in Figure 20 for a minute or more until the tingling quite disappears. Thereafter you are to resume letting your arm go, but in a position avoiding pressure on the ulnar nerve.

Should I try to avoid falling asleep when I lie to relax?

No. This would be effort. As stated previously, there is one and only one instruction: go negative in muscles that have received practice.

Why only one instruction?

Because one instruction is all that is required. It is the one and only possible instruction required to produce effortlessness - or at least a state of diminished effort.

Why should I learn to relax slight tensions?

Because slight tensions constitute much of what we customarily regard as "mental activity".

Then improved control of thinking and emotions can result?

Yes.

Should I keep telling myself to relax?

No!

Should I keep telling myself that this will do me good?

No! That would be autosuggestion, which should be avoided as much as possible.

What is differential relaxation?

During activities at work or at play, unnecessary tensions should be relaxed. Obviously, necessary tensions should be continued. This differentiation makes for efficiency in work and sports.

Why is it important for students to learn to recognize slight tensions, including those in muscles of vision and speech?

Because slight tensions of eyes, speech and all other muscles participate in learning, attention and recall.

Is it important at certain times to be skilled at relaxing such slight tensions?

Yes.

Why?

When attention is being alerted to subjects of study, it is helpful to relax any distracting tension patterns, i.e., those pertaining to unrelated matters.

CHAPTER XVII

CLASSROOM TEACHING: ALL AGES OVER TEN

1A

Lesson 1

"It is easy to spend money but harder to get the most for it. Also, it is easy to spend your energy but harder to get the most for it. Whenever you move, talk, meet someone, play a game, exercise, study, recite or even think, you spend your energy. How to get the most for your energy bears on everything you wish to do better. We call it 'tension control' or 'tension self-control'. It is interesting and useful to learn this". So the teacher may begin Lesson 1, reading aloud as stated above.

"We all want to learn how to drive a car", the teacher continues. "Still more important is to learn to *run yourself.*

"Please arise from your seats for a moment, then sit down. Try to describe how you did so. It is amazing that people move about and do things all day long with no realization *how* they do them. People act without realizing how. Yet how impossible it would be to drive a car without knowing how!

"Now is the time for you to begin to learn more about yourself: how you operate your own machinery; how you move, walk and talk and do all else. All behavior consists of muscle tension and relaxation", the teacher begins to explain. "Muscles look like raw beef-steak. They consist of long fibers, generally too thin to see with the naked eye. They shorten with every effort. Shortening is called *'contraction'* or *'tension'*. Thereafter they lengthen naturally without being stretched by force. This is called 'relaxation'. Muscles mostly outside of the skeleton, which **you operate** in all the actions, are called *'skeletal muscles'* or *'voluntary muscles'*.

"Every person has about one thousand and thirty of these voluntary muscles which he uses at every moment in one complex combination after another. Picture the complexity of these continually varying muscle 'configurations', for this is the voluntary part of human life; this is the 'will' in action! The configurations tend to persist, so that some muscles continue to be more or less tense most of the time. You do not stop completely as the wheels of a car stop. Even when you rest, you do not relax all of your muscles completely. You continue to tense your muscles at least slightly. This is called 'residual tension'. (Pupils should repeat this and all other new terms aloud. They will do so readily.)

"You can control your skeletal muscles but you have not the same control over your 'visceral' muscles. These are called 'smooth muscles', because they do not appear striped when you look at them under the microscope, as do all voluntary muscles. You have smooth muscles which operate automatically in your digestive tract and your blood vessels. They are automatically under the control of what is called the 'vegetative nervous system'. You operate your skeletal muscles, but you do not operate your visceral muscles. Next time you see the stomach and intestines of any animal, look at them for a few minutes, noting what 'visceral muscles' look like. We don't eat these as a rule, but carnivorous animals enjoy eating them and thrive on them.

"Also look at the heart of a chicken in the kitchen. This is almost all muscle, but you can not control your heartbeat directly. The heart is not composed of smooth muscle, nevertheless beats automatically.

"In fact almost all of your internal activities are run automatically, including your vastly complex chemical establishment. The only part of you which you control directly is your skeletal muscle system.

"This can remind you of an automobile, which runs automatically, once you start it and 'give it gas'. You begin by turning the ignition key. This can be called a 'control'. (Please repeat the word, 'control'!) Thereafter you press your foot on the accelerator pedal to supply gas. This pedal is also a 'control'. Other controls of the car include the steering wheel, the brakes and the devices to change speed and to reverse direction.

"Like the car, you have devices for control of your movements and position. Rest your left arm on the desk (or elsewhere in view) and bend back the hand at the wrist (See Arm 1, page 125). *This is you doing.* While you continue bending, be sure to notice a vague sensation in the upper part of your left forearm. This sensation is from inside the muscles which are shortening and pulling back your left hand. This sensation is your signal of your muscle contracting. It will serve you well if you learn to observe it in your muscles, for it is like the controls of an automobile for you to use in self-control. By observing this signal when and where it occurs plus learning to put the power on and off at will, you can learn to run yourself, as you learn to drive a car. It will prove of great value, interest, comfort and efficiency!

"*Only you* can drive your muscles. Learning to manage them will mean a new freedom for you. If you regard freedom as precious as most young people do, you will have much to gain by learning tension control. No-one can take it away from you, because it is internal.

"As you will see later on, tension control will help you to run your emotions and your thoughts more the way you like, with no interference from others. It can be called, "the new freedom". In no preceding age has this been available for learners, for like going to the moon it is a late product of exact science.

"However, this freedom is not remote but *in you.* Think of its many uses: control of unwanted fears and other emotions, control and thereby avoidance of many types of fatigue, insomnia, discomfort. Better athletic accomplishment, better personal relations, better attention, learning and memory!

"What price are you to pay for learning to accomplish these many ends? You will need to practice as you will need to practice to acquire any other valuable skill, like playing basketball or driving a plane.

"Learning tension control includes learning to relax your skeletal muscles, whereupon your visceral muscles tend to relax also. *Tension control does not mean laziness.* Instead, it consists of your becoming more efficient and successful in everything you do, at leisure as well as at any form of work.

"What can you expect from learning tension control? You will save your energy and do almost everything better. What kind of energy? Gasoline? No! People do not move by gasoline! This is burnt in automobiles to provide the energy necessary for their movement. If not 'gas', what do we burn in our muscles, nerves and brain when we make any effort? We burn *adenosine triphosphate.* Repeat aloud this chemical phrase, for it concerns you at every moment!

"Do you buy adenosine triphosphate? No, you manufacture it internally. This is good, for you would not know how.

"Your internal factory manufactures it from certain foods. Evidently this is lucky for you! We need not discuss the chemistry.

"Muscular exercise is good, for it increases the availability of adenosine triphosphate. Skilled relaxation also is good, for it saves your valuable energy, your most precious resource!

Lesson 2

A good way to teach a class is to call for a volunteer who sits where all can see. Ask him or her to bend back the left hand, as in Arm 1, page **125** The class should do likewise. Their arms should rest on their desks, or on the arm rests of their chairs within sight of the teacher. All are to observe the sensation in the upper portion of the left forearm and are to point to the signal with the other hand when they recognize it. The teacher makes sure that they indicate correctly. This sensation signals that the muscle fibers are shortening. The class should compare with the same region of the right forearm, where the signal is approximately absent. While the bending occurs, the teacher says emphatically, "*This is you doing!* You are driving your muscles! The signal tells you so! Whenever you drive your machinery, there will be signals in your muscles which inform you to this effect."

If the volunteer has continued to bend back the left hand during these instructions, the teacher requests him or her to discontinue. The class are to do likewise. "What happened to the signal?" the teacher asks. When the answer is, "The signal disappeared!" the teacher adds, "You can recognize that you are relaxing any part when this signal diminishes there and you can recognize increase of tension by increase of this signal.

"When we look at the volunteer bending his hand back at the wrist, we know that he is tensing certain muscles", the teacher reads aloud from the present text. "Our vision provides signs and signals of his tension which we can call external signs." With electrical instruments tension can be measured.

"Internal signals are called 'subjective'," she reads, "while external signals are called 'objective'."

When the volunteer is directed to discontinue bending, the teacher should make sure that the hand is not restored to its former position by muscular effort, however slight. "*An* *effort to relax"*, she could read aloud, *"always is failure to relax"*.

Upon request to relax, many beginners quickly restore a part to the former resting position. This is wrong, for it requires tension. Teachers should learn to detect the tension by observing the volunteer and pupils closely. Teachers should correct this error in themselves. Effort to relax is called "the beginner's error". The class must be taught to detect this error. *Effort to relax always is failure to relax.* True relaxation is effortless. The teacher should repeat this statement many times.

Have the volunteer and class bend the hand forward at the wrist, as in Arm 2, page 125. The active muscles then are in the forepart of the forearm. They are the muscles that flex the hand. Ask everyone to look for the control signal! Where is it? "You will note it in the muscles in the forepart of the forearm." Many find this readily for themselves. Have them notice it, again and again, while the hand is continually flexed. Beginners need to observe repeatedly.

The teacher will need to give each and every pupil personal attention. This may require walking about the classroom.

"Now, let go without effort!" Many will tense arm muscles to return the hand to its former position, face down, instead of simply discontinuing the tension. As stated above, the teacher should correct this promptly.

Repeated observation of the control signal is required. When pupils are in doubt during any practice, they should learn to remind themselves of the control sensation in the upper portion of the left forearm by bending back as in Arm 1, in order to compare therewith the sensations about which they feel doubt. Teachers should repeatedly tell the class, "Do not try to remember the location of muscles and signals. Instead, learn to identify the control sensation when it occurs anywhere."

More than once the teacher will need to explain that with repeated practice, observation and relaxation of tensions soon become automatic. It is easy to learn to relax and the learning will be pleasant, refreshing and helpful.

Many people believe that when they are quiet, they are relaxed. They do not know that holding still is being quiet but is not relaxing. They need training in order to learn to recognize that they are spending their energy, burning adenosine triphosphate in their muscles, even though they appear quiet.

From time to time the teacher notifies the class as follows:

"It is never necessary or correct to tense any part first in order to relax it. In driving a car you would never first press the accelerator pedal when all you want to do is to let the car stop of itself. So with a group of muscles, if you only are to relax them, avoid tensing them first. To form the habit simply of relaxing without tensing first, let the arm remain at rest on your desk or elsewhere, and begin to let go without first tensing muscles as you did in Arm 1 and in Arm 2. *Every third period of practice throughout the course is to be devoted to* letting go only, with no preceding tension. We avoid the bad habit of tensing first in order to relax by inserting a third period of letting go without preliminary tension following every preceding couple of practice periods in which we tense a part first and then relax it. This will apply to all periods throughout the body."

Every teacher should watch carefully for another error characteristic of beginners. Having relaxed the hand or other parts, they leave it rest for only a few seconds or minutes and then move it to a new position. The movement may escape the teacher's eye, but the new position should be taken into account. "You have tensed your arm instead of keeping it relaxed", the teacher should correct. "Why? Whatever the reason, whether for comfort or just for a change, you have failed to keep your arm relaxed. How do I know? Because I see that you have changed the position of your hand. You tensed your arm muscles to make this change. This was tensing, not relaxing.

"The instruction is to relax your arm and keep it relaxed, without tensing for any reason whatsoever, whether good or bad. This is one of the first steps in learning to be more relaxed habitually. Untrained persons tend to move their arms, legs and other parts unnecessarily from time to time.

"Many people assume that if a part does not move, it is relaxed. Often this is far from true. Even when they appear to be quiet, arms, legs and other parts may be tense. The muscles generally are contracting steadily, perhaps slightly, to hold the part still. Then contraction in agonists is balanced by counter contraction in antagonists. This results in an appearance of quiet, generally mistaken for relaxation.

"We can illustrate this now. Stiffen both arms steadily but slightly to hold them still. Notice the control signal in both arms. It is you doing! You are holding still, but are not relaxed!

"Sitting where you are, without any preliminary tension, let go your left forearm muscles." (Note to teacher; This can be done, as you prefer, with eyelids closed or open.)

While the volunteer bends the left arm at the elbow as in Arm 4, page 126, the class follows the example. All should observe the control signal in the biceps and other forearm flexors.

"This practice", the teacher explains, "is not a muscular exercise to develop muscles and circulation. Exercise is good in its place, but is not the way to learn to relax. Bend-the arm (as in Arm 4) is only for purposes of learning to observe when tensing is present. When your skill in observing slight tension increases, you should bend the arm at the elbow less and less, in order to sharpen your observation. The contrary is true for athletic exercises, which usually are performed with increasing vigor.

"Understanding this point will lead you to avoid books which advise their readers to engage in 'breathing exercises'.

In learning to sing or to speak publicly, breathing exercises are indispensible. However, breathing exercises do not help you learn to relax and any author who does not understand this evidently has never set foot in the laboratory where tension and relaxation are electrically measured."

" Practice makes perfect!" has often been said by teachers. Daily practice is needed to learn tension control. Accordingly, relaxation periods of at least ten minutes should be arranged when the pupils practice with only their own supervision. Half-hour periods may be begun later in the course.

Arm 5, page **126** illustrates how books on desks can be placed *under the wrist* for bringing attention to muscles on the rear of the upper arm, "the triceps". The teacher requests, "Press your wrist down against the books! While you do so, do not press your hand down, but let this part remain limp! Note the control signal in the back of your upper arm! Thereafter relax, noting the diminution of the control signal!"

Lesson 2 includes teaching progressive tension and relaxation of the arms. Instruction is given the model and the class, "*Slowly, slightly, uniformly* begin to stiffen both arms (or either arm, if preferred). Continue to increase the stiffening *very slowly* and *progressively* during three or four minutes."

The teacher watches model and class carefully, warning that tension increase should be very slow and continuous. After several minutes of slow progressive tension, the instruction may be read aloud, "Whatever you have been doing to increase the tension gradually, begin now to do it a little less; *slightly, uniformly, progressively, a little less effort in your arms!* Continue this decrease gradually up to and past the point where you no longer detect tension in your arms, for some degree of tension will still persist beyond your notice.

"Progressive tension, as illustrated in this practice (not an 'exercise'), is a most valuable thing for you to learn. To become successful at it, you will need to practice by yourselves in leisure time at home or elsewhere!"

Lesson 3

The third lesson may begin with performance by the volunteer, if employed, and by the class of bending up the left foot as in Leg1, **page 127**.The purpose is to note the control signal, the feeling of muscular tension, in front of the leg. When asked, "Where is the control signal now", some pupils will wrongly indicate the calf. The teacher should make clear that the signal in the calf is *"strain"*, not tension. Strain is passive, due to muscle stretch, not the pupil doing voluntarily. The teacher can produce strain in the calf of the model by bending the foot up forcibly. Upon bending the foot up, the control signal is in front, while strain is produced in the rear when calf muscles are passively stretched.

Thereafter to note the control in the calf muscles, the foot is bent down as in Leg 2, **page 127**.To note the control in the front muscles of the thigh, the foot is moved slightly forward as in Leg 4, **page 128**.To note the control in the posterior muscles of the thigh (the "hamstring muscles"), the leg is bent slightly backward at the knee-joint, as in Leg 5, **page 128** To note the control signals in the left buttock, the left foot is pressed down against the floor, as in Leg 7, **page 129** To note the control signals in the front of the hip, which is deep in the abdomen, the thigh is bent upwards as in Leg 8, **page 129** In doing this the control signal is very vague and the teacher should point out to the pupils where it is occurring. The teacher's finger should be about two inches behind the hip-bone, and point to the depth of the abdomen. The hip flexor muscles lie deep in the abdomen.

Lesson 3 ends with showing the pupils how to progressively tense and then to relax the leg, one or both legs. The procedure is like that of progressive relaxation of one or both arms. They are instructed to practice one half-hour daily at home or at school, following the instruction in the paper manual which they can purchase for twenty five cents.

Lesson 4

" Today we are to begin on trunk muscles. Pull in your abdominal muscles slightly and look for the control signal!" So the teacher may introduce Lesson 4, addressing the volunteer and/or the class. The teacher needs to be sure that the act is performed slightly as shown in Trunk 1, page **130**

The correct answer is that the control signal is noted vaguely all over the abdominal wall. The teacher explains that what is called "good posture" requires pulling in the abdomen so that it does not protrude. This is required in all military training. It improves appearance. However, many people believe that "good posture" is prerequisite for good health. Evidence for this does not exist. Apes lead healthy lives as a rule, but with abdomens protruding. Nevertheless, a protruding abdomen does not look well. It is not esthetic. Thus it is often worth the price (in energy) to pull in the abdominal wall moderately upon standing and walking.

As you sit or stand, stiffen the back slightly, making your trunk more erect. Where is the control signal now? Where are you doing?" The performance is to be as in Trunk 2, page **130**

"There are 32 muscles on each side of your spine", the teacher may add. "It is easy to locate the control signal! After you have done so, let the back go quickly. Thereafter, stiffen once more, but this time let go slowly and progressively, as you practiced with your arms, later with your legs."

Following the two practices above indicated, the pupils are to learn to relax the breathing musculature. The teacher should inform them that this is most important, asking them to observe and to report what takes place and where during ordinary quiet breathing. They should report that the control signal then appears diffusely over the chest, diaphram and in some also in the abdominal muscles. See Trunk 4, page **131** .

"When does the control signal appear during ordinary breathing?" the teacher then asks. "Does it occur when you breathe in?" "Yes", is the correct reply. "Does it occur if and when you hold your breath however briefly?" Again the correct reply is "Yes!" "Does it occur when you let your breath out?" "No", is the correct reply, "I relax with expiration, unless I force the breath out." "What about the pause in breathing following expiration?", the teacher asks. "No" is the correct reply, "my chest, diaphragm and abdominal muscles seem relatively relaxed during the pause before breathing-in."

Most important in learning to relax, we repeat, is the correct instruction regarding breathing. Learners should be warned against books which claim to teach relaxation scientifically, but which urge readers to engage in "breathing exercises". "Breathing exercises" lead learners in the wrong direction. They lead learners to tense the chest and abdomen in order to promote relaxation. This exemplifies ignorance on the part of such authors. They have never measured muscle tension with the integrating neurovoltmeter and do not know whereof they write. We regret to be critical, but correct teaching requires that we do so forcefully.

"Relax your chest and abdomen in the same way as you relax your arms and legs" is the proper instruction. "Make no effort to avoid or lessen breathing! Just go negative!"

A difference exists, however, between relaxing breathing and relaxing the limbs. This should be clearly explained to the class, repeatedly. For example, an arm may be relaxed to the neighborhood of zero tension, whereupon the arm does not move. However, as needs to be explained to all pupils, the case is different upon relaxing the chest and abdomen because they do not become motionless as does the arm. Breathing nevertheless continues but becomes shallow, slow, regular as clockwork. Why? Because upon relaxing the chest control, the breathing rate and depth is regulated by the center of respiration in the medulla of the brain. Breathing rate and depth then proceed automatically, depending possibly upon the oxygen tension in the plasma that bathes the respiratory center.

One can tell if a person is well relaxed by watching his breathing. Ordinarily in quiet sitting or standing, the normal breathing rate is about 18 per minute. However, during advanced muscular relaxation of the whole body, the rate falls and the count may be 12, even as low as 6. Furthermore, the rate is rhythmical like clockwork and the breaths become shallow.

Pupils need to be allowed time to practice daily for at least 15 minutes, but better for 30 to 50 minutes to attain the skill outlined.

Lesson 5

As the teacher explains, Lesson 5 has to do with the upper trunk, especially the shoulder region.

"Bend back your shoulders a little", may be the instruction. It is relatively easy to detect the control signal, which now is in the shoulder blades, as shown in Trunk 5, page 131.

In the following procedure, the pupils are to lift the left arm forward and inward in order to discern and report the control signal in the upper, frontal muscles of the left chest (Trunk 7, page 131). When the pupils let go, the teacher watches carefully to see whether they replace their arms on their desks or laps, using tension to do so. This is wrong, indicating the "beginner's error", namely, making an effort to relax. The relaxed arm drops on the chest like a rag doll, if unsupported. The teacher will do well to illustrate the way to really relax, in contrast with the restoration of position, which is effortful. After success with the left arm, it is easy to repeat the act of tensing and then relaxing the right arm successfully. See Trunk 8, page 132

After instructing the class to let the involved muscles relax and giving them sufficient time to do so and to report accordingly, they are requested slightly to shrug the shoulders as in Trunk 10, page **132** The correct report is that tension is noted extending up into the back of the neck.

Thus lesson 5 comes to a close.

Lesson 6

The neck is an important structure in everyone. It holds up the head. Its muscles turn the eyes to see what requires attention. Among other functions, it is thus an accessory eye structure.

"Hold up your heads!" the teacher may say to the class. "Notice the control signal all around the neck in its various muscles! Bend the head slightly back!" See Neck 1, page **133** . "During this bending, point to the control signal!" Many of the class will promptly point correctly to the back of the neck. This is readily observed.

"Bend your chin slightly down!" (as in Neck 2, page **133** This should elicit reports that the control signal now appears on both sides of the neck.

"Bend the head slightly to the left! During this bending, point to the control signal!" See Neck 4, page **133**

Some will point wrongly to the right side of the neck. "Strain" is the chief signal there, although slight tension also occurs. However, careful observers will point to the left side of the neck, correctly.

In this bending, the chin is to face forward as in Neck 1. The teacher should be on the lookout for rotation of the chin, whereupon the chief tension is not on the left.

"Bend the head slightly to the right" (as in Neck 5, page **134**). This should elicit reports that the control signal now appears chiefly on the right side.

The lesson is concluded with the instruction to hold the head erectly, relaxing the neck as far as possible in this posture. Following five to ten minutes practice at this, the teacher can explain that although the individual is active in the neck, it is relatively relaxed. This is an example of differential relaxation, which means energy saving during all kinds of behavior.

Lesson 7

We come to the eye region, highly important in the self-direction of every normal person.

"Wrinkle your forehead!" the teacher may say. See Eye Region 1, **page 135** Where is the control signal now? Many of the class will at once point to the region of the wrinkling. A few may fail to wrinkle when requested to do so.

Following this practice, as with every practice shown in the figures, the teacher should say to the class, "Discontinue tensing!" or "Go negative now!" Likewise, thereafter, several minutes at least should be allowed for the relaxation to be accomplished and to be prolonged.

For variety, following apparently successful relaxation, the teacher may say to the class, "Repeat, but this time wrinkle only half as much as last time!" Again, the class is requested to relax the wrinkling, specifying slow relaxation or quick relaxation as desired.

Following the relaxation of the wrinkling, once more the teacher may direct the class to wrinkle still more slightly, noticing the fainter control signal, then relaxing the forehead once more toward zero tension. The class should be informed that this kind of serial practice is *"the method of diminishing tensions"*. They can apply it to the contractions shown in any of the illustrations.

"Please frown!" requests the teacher. See Eye Region 2, **page 135** However willing, not everyone complies. A small percentage of people do not frown. Darwin stated that a higher animal frowns when in trouble. Also frowning in human beings tends to occur in bright light.

After several minutes have been allowed for relaxing the forehead and the brow, "Please close your eye-lids tightly", the teacher can request. See Eye Region 4, p. 135 . Where do you find the control signal?" The pupils should indicate their eyelids. "Wink frequently." Again the pupils should indicate their eye-lids.

After five minutes or more have been allowed for relaxation, the class is requested to look slightly to the left. See Eye Region 5, p. 135 . When the teacher asks, "Where do you feel the control"? the class should point to their eyes. "Now do not bother to look to the left", can be the instruction. Thereupon the eyes are to begin to relax instead of focusing on whatever is in sight. Again, after five minutes or more have been allowed for the eyes to become a little more relaxed, the teacher directs, "Please look slightly to the right, noticing the control signal!" See Eye Region 7, p. 136 . The pupils should report that the signal once more is in the eye-ball region, after which they are to relax the eyes, along with the forehead, brow and lids.

Similar instructions are given by the teacher to look up as in Eye Region 8, p. 136. then to relax for several minutes, to look down, as in Eye Region 10, p. 136, then to relax for several minutes, finally to look forward as in Eye Region 11, p. 136, and then to relax for several minutes.

This lesson has been devoted to learning to observe eye controls in vision, followed by eye-relaxation.

Lesson 8

"We saw that people do not know how they perform even simple acts, such as arising and sitting. Still less do they know how they use their 'minds', as when they imagine or recall. Today we are ready to bring on this interesting question". The teacher may choose to read these lines aloud and then continue as follows:

"Please close your eyes and keep them closed while you observe what you do after I give certain instructions. Begin by relaxing the muscles of your arms, legs, trunk, neck and eye-regions, including forehead, brow, lids and eyes. We will allow five minutes for you to relax your muscles generally, while you remain sitting.

"Keeping the eye-lids closed, imagine an automobile passing by quickly. Report what takes place! Who will volunteer to report?"

If the volunteer is a good observer, the report will be tension in the eyes as they moved left to right or right to left in picturing the car.

After again allowing several minutes for eye relaxation, the teacher may direct, "Imagine a plane ascending quickly into the sky!"

Observant pupils will report tension in the eyes as they seemed to move upward, as if to follow the plane.

Again several minutes should lapse before the instruction, "Imagine a bird flying from tree to tree!"

Observant pupils will report tension in the eyes as they seemed to move variously to follow the imagined bird. Some pupils may report simply, "I tensed my eyes to follow what I was picturing".

After each act of visual imagination, the teacher may request the pupils to relax the eyes along with the neck, trunk and limbs. "Do not bother to picture anything at all! Just let the eyes go completely!"

"What happens when you really relax your eyes?" This question will elicit from skilled pupils the answer, "I do not visualize when my eyes are relaxed. I do not even think!"

All pupils will profit from many examples for visualization followed by progressive relaxation. Following are further examples:

"Imagine a man walking by slowly"; "Imagine a flower fluttering in the breeze"; "Recall this morning's breakfast table"; "Think of the President of the United States"; "Recall where you were at some time yesterday"; "Think of what you will be doing tomorrow morning".

Interested students may be encouraged to think of personal or other matters upon their own selection, in order to observe for themselves and to practice relaxation of the eyes thereafter.

Normal people make continual use of the eyes in seeing, imagining, recall, attending at all waking moments. The pupil who learns to observe how he makes use of his eyes in mental activity will know how his "mind" works and will not be content with saying, "Imagination and thinking occur purely in the brain!"

He will have acquired a practical tool to improve his attention, learning and memory. The pupil who is over-tense fails to give best attention. Other matters besides what he is attempting to learn tend to distract him.

Teachers should explain this and should speak of differential relaxation. Attending, learning and recall require certain effort-tensions which need full play without inhibition by tensions concerning irrelevant matters. The person who learns to become habitually relaxed is prepared to turn his efforts to the accomplishment of his purposes freed from inhibitions.

Lesson 9

"Close your jaw somewhat tightly", the teacher may dramatically open Lesson 9. "Where are you spending your energy? Where now are you burning your adenosine triphosphate?"

Pupils generally point correctly to the region of the upper jaw on either side of the face. "How high in the head is the control signal?" To this question some may correctly indicate the temples.

In any event the teacher will do well to have the pupils "discontinue tensing" for several minutes, thereupon to repeat the jaw closure as many times as may be required for everyone to indicate by pointing to the region of the masseter muscles, including the temple regions. See Speech Region 1, page 138

After the teacher has become satisfied that the pupils all have observed the control signals upon jaw closure, the class may be requested to open the jaw moderately, while looking for the control signals once more. "The muscles which close the jaw are among the strongest muscles", the teacher may explain. "Consequently the control signals upon jaw closing are very evident. In contrast, the muscles which open the jaw are relatively weak. Consequently the signals upon jaw opening are relatively faint. Upon repeatedly opening the jaw, you may notice them spread out superficially under the chin. See Speech Region 2, page **138**

"Practice keeping the jaw open, relaxed. For learning to sing and to speak publicly, teachers have their pupils practice at opening and closing the jaws by pushing them up and down speedily with one hand. Try this now on yourself! You may be surprised how stiffly you hold your jaws. 'Jiggle' them up and down until the resistance lessens! This is good practice!"

Following fifteen to twenty minutes devoted to jaw instruction, the teacher may request, "Smile, showing your teeth! Where now is the control?" Pupils often find the control readily, pointing to their cheeks. See Speech Region 4, page **139**

"Discontinue smiling!" the teacher may proceed to say; "just let your cheeks go. No effort at all!"

After five minutes or a little more has been alloted to cheek muscles, the instruction is given, "Pout your lips as if to whistle or to say, 'O' and note the control". Pupils often indicate promptly that the control now occurs in the lips themselves. See Speech Region 5, page **139** It is useful to direct the pupils to repeat the act of smiling, in order for them to note that then there is a strong signal in the lips

not due to tension-contraction there but due to stretching of the lips. This signal is called *strain*. "It is not you doing!" the teacher points out. "Strain is something done to you. Bend back either hand to notice the strain in the wrist, distinguishing this signal from the signal of 'you doing' in the back of the forearm". (See Arm 1, page **125** .)
"We come now to your tongue", may be the opening remark. The tongue is a remarkable structure, mostly all muscle, except for the covering mucosa, able to move in every direction, with more facility than a worm. Hold it slightly forward against the teeth! (See Speech Region 7, page **139**) Where is the control?" Pupils should answer, "In the tongue itself". "Where else?" They should indicate the floor of the mouth. They should be reminded of the calf's tongue they have seen on the dinner table: a huge affair. Similarly, their own tongues extend under their mouths. "Pull back your tongues slightly", the teacher may instruct. "Where now is the control signalization?" See Speech Region 8, page **139** Correctly, pupils may answer, "In the back of the tongue and in the floor of the mouth" (indicating).

After the pupils have moved the tongue about in the mouth, the teacher allows about five minutes to relax it along with the other speech muscles, including those of jaws, cheeks, lips, larynx and breathing muscles in chest and abdomen. The teacher then requests them to 'count aloud to ten, observing the controls'. A full report by the pupils then lists the tensions as present in "temples, jaw regions, cheeks, lips, tongue, floor of the mouth, chest and abdomen."
"Count half as loud", later requests the teacher. A full report lists the same tensions, as less intense. "Once more diminish the loudness by half" continues the teacher. Needless to say, precision is not expected in employing this method, called "the method of diminishing tensions". Following correct reports, the teacher requests, "Count to ten so slightly that it can scarcely be heard!" Thereupon the reports should list the same tensions but with faint signalization. "Imagine

that you are counting to ten! What is the report?" Clever observers will list the same tensions or at least some of them as marking the occurrence of imagined counting.

"Imagine that you are saying your name and address three times", requests the teacher. Once more keen observers give the same list or some thereof as in actual speaking, but much fainter signals. "Imagine saying your address", should bring similar reports. The teacher should have the pupils imagine saying the name of the city or village in which they live, the name of the President of the United States, and imagine speaking about other familiar matters. The purpose is to teach the class to observe and understand that they use their speech muscles commonly to imagine, recall and think. Upon instructing them to relax the tongue and jaw muscles toward zero tension, skilled pupils will report that so long as the speech muscles are relaxed completely, they do not attend, imagine, recall or think of anything at all. Their minds become inactive. They become "blank" when their eye and speech muscles become effortless.

The skill thus acquired proves useful in the control of attention and emotion. When a person trained to relax needs to control his emotions and his thoughts, he can do so effortlessly. Thus he can save energy, avoid strain and diminish stress.

No one becomes perfect at this valuable art. There is no magic. Autosuggestion is avoided, likewise all forms of hypnosis and trance states. Teachers should understand the difference between suggested states and the freedom and skill of self-control learned step by step, following the directions of this chapter. In states induced by suggestion, the individual follows like an automaton. If he is hypnotized, the hypnotist becomes his "boss". If he makes the suggestion for himself to follow, likewise he tends to follow the program suggested more or less automatically. He resigns his autonomy, so to speak. In the author's half century of psychiatric experience, autosuggestion tends to be a habit more likely to favor neurosis than to deter it. /1/ In contrast with suggested and trance states, tension control teaching favors being "one's own boss". Tension control is the opposite of "neurasthenia" in the old fashioned sense of "nervous weakness". In a popular sense, tension control indicates so-called "nervous strength".

In the present era, perhaps the author should frankly point out his disapproval of teachers in schools and colleges inclining toward "Yoga", "transcendental meditation" and forms of suggestion or trance states. Fortunately these cults have not up to date become a school problem. Sufficient unto the day is the evil from the use of marijuana, heroin, amphetamines and other addictive drugs!

Lesson 10

In the final session the teacher will do well to remind the pupils of the benefits of self-control through relaxation techniques. One should not hesitate to repeat important matters, since repetition is commonly the key to learning.

"Saving your energy", the teacher may emphasize, is important in more ways than one. Often it will make you feel better, more inclined to work and play vigorously. Often it will avert fatigue. Often it will render you less susceptible to accidents and those forms of illness favored by exhaustion. Possibly daily practice may favor longer life, although this has not been established.

The teacher may relate to the class that during World War II, the United States Navy Schools of Flight taught tension control to young cadets. Many suffered from fatigue and nervous breakdowns. Five naval officers trained by the author in Chicago successively taught the methods to ninety-five other naval officers, making a total of one hundred teachers of progressive relaxation. The results were published from U. S. Navy experience. During the first seven months, 15,300 cadets received instruction! The results showed marked prevention of nervous states, lessened fatigue and accident rate and improved sleep! /2/

Particularly in education, tension control techniques favor the improvement of attention, learning and memory. The overtense person often pursues more than two directions at the same moment. He thinks of one thing, perhaps intermittently, when he should be given entirely to the pursuit of the moment. The overtense person pursues divided purposes. In this, he fails to follow the adage, "United we stand, divided we fall!"

The differentially relaxed person feels at ease, does not suffer from discomforture. When he visually imagines and when he sees, his eyes do not fluctuate but turn directly to look at the object imagined or seen. He has the appearance of cohesion, application, efficiency.

No machine can learn. Human beings and animals can learn, whereby they develop automatic adaptation. When a person becomes skilled in tension control: (1) He acquires increased ability to run (drive) his organism at any moment according to his purposes and welfare, and (2) he acquires automatic responses to difficulties and problems as well as to comforts and pleasures. Such automatic responses never occur in man-made machinery. We call them *"habits"*.

Progressive relaxation is adaptable to habit reformation. Quitting an undesired habit, such as smoking, is more readily accomplished. Studies are desirable to determine its usefulness in alcoholism and drug addiction.

The teacher requests the class to read any book at hand. Allowing a few minutes for them to begin, they are asked, "What takes place in you when you read? What do you do to get the meaning?"

Soon some pupils are likely to reply, "My eyes follow the words from left to right and then descend to begin the following line."

"What else do the eyes do?"

"They look briefly at visual pictures indicated by the words."

Only good observers are likely to give these answers. The teacher explains to the entire class that getting the meaning requires visualization with slight eye-movements to focus or to look at the visualized picture. Often this is vague and fleeting in hundredths of a second.

"What else happens in you"? asks the teacher. Correct answers mention speech tensions as if to say to oneself parts of some of the words. Tensions may appear to be in the jaw muscles, including temples, cheeks, lips, tongue, floor of the mouth, larynx and breathing muscles of chest and abdomen as if to say the words or parts thereof.

The teacher may request any pupil who has shown skill in observation to relax the speech parts to zero while trying to continue to read. The skilled pupil will characteristically report that reading stops automatically. It is impossible to read so long as incipient movements of the speech parts remain completely relaxed.

"We read with our eyes but also with our speech muscles", the teacher should emphasize.

"So, also, do we think!"

Some pupil may ask why various courses in rapid reading teach that movements of the lips, and tongue and other speech parts are limited in rapid reading.

This teaching is incorrect. Incipient speech movements become diminished and more rapid and vague but always occur when anybody reads and gets the meaning as he reads.

We correct this statement by some teachers of rapid reading on the basis of measurements which the author has made with the integrating neurovoltmeter.

Such measurements are indispensible to determine whether rapid movements of speech parts are or are not indispensible to reading and getting the meaning.

Up to date no teacher of rapid reading has possessed an instrument for testing what really occurs in rapid reading.

In the author's laboratory these tests have been laboriously employed. The results are shown on graphic records. They indicate, as said above, that reading and all forms of thinking include incipient movements of eyes and speech organs to visualize what is meant and to say, or being to say some of the words of the print.

Practice as in Fig. 10, p. 140. A complete course in self-operations control (SOC) includes practices in the lying posture followed in the same muscles and sequence in the sitting posture.

Reading and thinking include abbreviated, rapid responses of muscles of eyes, speech and of other parts. Indeed, every thinker does so by the employment of some or all of his thousand thirty skeletal muscles. They respond in slight or marked variations of tension with variable time lag and durations. The gradations and variations of what muscles are employed and in what combination, tensity and temporal variation constitute the keyboard of the reflection of everybody.

NOTES

/1/ While hypnosis, psychiatric suggestion and autosuggestion do not belong in the class-room, nevertheless these are important fields of laboratory science and clinical experimentation.

/2/ Neufeld, Commander William, Relaxation Methods in U. S. Navy Air Schools, American Journal of Psychology, Vol. 108, No. 2, August 1957.

CHAPTER XVIII

CLASSROOM TEACHING: AGES UNDER TEN

A. Six to Ten

Younger children often play at being engines or motor cars. Teachers can take advantage of this playful enjoyment to train children in self-operations control. The child finds that he does not need to pretend. He learns that he really is an instrument and that he can run himself.

About ten years ago, this approach was introduced at the University of Montreal under a grant from the Government of Canada, Department of National Health and Welfare. Dr. Gustave Gingras, Professor of Physical Medicine and Rehabilitation, stated that the purpose of the research project was to evaluate objectively and statistically the influence of special methods of tension control training upon the underlying tension states as well as upon the symptoms of stammering, stuttering and cerebral palsy. He continued, "In rehabilitation fields concerned with the training of patients presenting neuromuscular disorders, the muscular decontraction and relaxation methods developed by Dr. Edmund Jacobson of Chicago, Illinois, U.S.A., have for many years been internationally recognized. Recently he has developed specific new techniques applicable to stutterers and the cerebral palsied as a means of augmenting the effectiveness of tension control training with such patients. Efficacy of the new techniques has been validated clinically by Dr. Jacobson."

NEW METHODS FOR OLD ARTS

For the author, teaching children was a new experience. Two boys and a girl about eight years of age sat in the front row. They had some speech difficulties. Their mothers and a teacher were permitted to sit in rear rows without taking part.

As the children looked up expectantly, the teacher began, "Tommy, do you have an automobile?" Evidently flattered, after a little hesitation, Tommy replied, "No, but my father **does**!" "Does it go forward and back?" the teacher asked. "Yes". he replied simply. "Can you go forward and back?" the teacher continued. "Yes", he replied again. "Let's see you!" the teacher suggested. With alacrity, Tommy arose and did so.

After teaching in this conversational manner for about one half hour, the teacher suggested a brief recess but the children murmured, "Do we have to?" They were so interested that they wanted to continue without recess.

With younger children, then, tension control can be taught almost as if it were a game. The pupil learns to run himself as if he were an engine or an automobile. This is an attractive, easy and proper way to teach self-operations control. Children like to repeat pleasant responses and we advise teachers to bear in mind that repetition can be the key to learning. To begin, we suggest that the teacher address some member of the class, asking him seriously if he owns an automobile, as illustrated above with Tommy.

If the children are about six or seven years of age, it is useful to have them *engage in action* as illustrated in the following:

"Jimmy" (or John or Ruth, as the teacher prefers to address one or another of the class), "does your daddy's car go forward and back?"

"Yes!" will be the prompt reply.

"Can *you* go forward and back?"

"Yes!"

"Please get up and do so!" (The child carries this out cheerfully.) Addressing another child, the teacher may say "The car cannot go sideways. Can you go sideways?" The child does so.

"The car has wheels, doesn't it?"

"Yes!"

"You have no wheels, but you have something even better, so that you can move forward and back, sidewise and even jump. You have *muscles* in your legs. Also, you have muscles all over your body under your skin. When muscles shorten and lengthen, you can walk with your legs. Muscles in your arms shorten in different manners so that you move your arms variously, as in reaching for an apple or other object. Clara, please move your arms about to illustrate that muscles in your arms shorten and lengthen in variable patterns! Thank you! Also, Perry, you learned to write when you learned to shorten and lengthen muscles in your arms and hands properly to make letters, words and sentences.

"When we learn to do anything new, we become able to lengthen and shorten our muscles in new patterns. When we play any game, we lengthen and shorten our muscles.

"Everything we do all day long is shortening and lengthening our muscles. Each of us has many muscles. A car has only four wheels, but you and every other person have one thousand and thirty muscles under the skin.

"Jimmy", the teacher may continue, "when your daddy wants his car to move, what does he do first?"

"He turns a key in a lock, He turns on the ignition."

"Yes. We can call this turning-on a 'control'. All please repeat the word. 'control'! (They do so.)

"What does your daddy do next?"

"When he hears the engine going, he moves a switch to a part labelled "Drive" or "D", and then he presses a pedal under his right foot called the 'accelerator pedal'."

"Fine! Let's call the switch and also the accelerator pedal 'controls' of the car. Repeat the word, 'controls'! (They do so.) With the controls near where he sits, your daddy or any other driver can make the car go as he wishes.

"You can run yourself as your daddy drives his car. How? Where are *your* controls? I will tell you: They are tiny little things in your muscles, too tiny for your eyes to see. Next time when you see raw steak, you will be seeing muscles which look like any one of the thousand and thirty under your skin. But you could not easily see the tiny controls in the muscles which the animal used to move about as he desired. You could see them only if you put them under a microscope.

"There are thousands of these tiny controls in every one of your muscles. Many are in spindles of tissue too small for you to be able to see". The teacher draws a spindle on the blackboard. "But you can *feel* them when you tense a muscle.

"To feel them now in your arm, bend back your left hand at the wrist! Notice the feeling you have in the upper portion of your left forearm (Arm 1, page **125**). It is a faint feeling. Notice that when your left arm rests quietly, you do not have this feeling of muscle shortening. The feeling signals to you that you are shortening the muscles which have the feeling.

"We call this feeling, this signal from the elbow to the wrist in the upper portion of your left arm, 'the control signal'! Repeat, please. (They repeat.)

"When you get this signal, notice it. It shows you that your muscles there are shortening, which corresponds to wheels turning in cars. By this signal you can be aware that you are doing something there; that you are spending your energy as an automobile burns gasoline for the energy that makes *it* go.

"*You* do not burn gasoline. But you must have something to burn in order to do things. What is *your* fuel called?

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It is called 'adenosine triphosphate'. Repeat these words!" They do so.

"You burn adenosine triphosphate in order to move, work, play. The car burns gasoline.

"You can learn to run yourself as your daddy has learned to run an automobile. The first step in learning is to observe the control in your left forearm when you bend your hand back at the wrist. (See Arm 1, page **125**) This is called, 'contraction'! Repeat, please! When your muscles contract, they are working like wheels when turning.

"Now discontinue bending the hand back! Don't work now! Just let go without effort as your daddy lets the pedal go when he takes his foot off.

"Notice that the control signal disappears. This is called 'relaxation'. Repeat, please".

"If you want to make that signal stronger, bend your hand back further. See how much stronger it gets? Don't pull it back so far now. It gets weaker! Let it get *more* weak! Let it get *more* weak! Let it get *more* weak! Let it just *not work* at all! No work at all! When it doesn't work at all, we could call that 'relaxation', couldn't we? Only if it doesn't work! When the automobile isn't going, we could say it's relaxed then, couldn't we? Negative! Right!

"Let's do it again. Let's bend the hand back a little, a little more, a little more; You are using that control sensation, you see, to bend your hand back.

"Yes!"

"Good! And now not so much, *not* so much, *not* so much, *not* so much, *not* so much;—more and more relaxed! That's that, isn't it; more and more relaxed! That's good, isn't it?

"Let's do that now with the other hand, the right hand. Let's bend it back a little, a little more, a little more, a little more, a little more. Notice the control feeling? And now, not so much, not so much, not so much, not so much, not so much, not so much; just negative! That's pretty good, isn't it? You're learning to run yourself, as if you were an automobile. That's pretty good!"

"Yes!"

"I learned that once, too. You're learning it, aren't you?"

"Yes!"

"Now let's bend the other way: Bend the left hand forward a little, a little more, now. Where's the control sensation? (See Arm 2, page **125**) Point to it with your right finger! Where is the signal? That's where it is, right here on the front of the left forearm, all the way from wrist to elbow. Right? That's *you* doing it, isn't it? *You* are doing it, not I. I can't do it for you! Now, again, do it yourself! You have to run yourself! I can't run you, can I?"

"No!"

"I can't run you. I can run an automobile but I can't run you! Only *you* can run you! I can run myself. Here! I am doing it. Look! Just the same way as you did it, not differently. Here's my control sensation (indicating the front of the left forearm)! I feel it! And now I go negative gradually, relaxing, relaxing more. As you see, I can do that! I can do that! I can relax all over so I fall on the floor. And if I fall with muscles relaxed, does it hurt me?"

"No!"

"No! You can fall to the floor, too. But before that, I want to show you how to fall with muscles relaxed. It's a good way to do it, isn't it? You don't get hurt.

"Let's bend our left arms at the elbow, like this, (See Arm 4, page **126**) and notice the control signal in the front of our upper arms, in the biceps muscles. Let go now without effort! The control signal decreases.

"Let's push down our wrists against books (placed as in Arm 5, page **126**). Notice the control signal in the back part of our upper arms. All point to the control signal as soon as you notice it. After you have noticed the control signal, go off with the power. The control signal then disappears, doesn't it?"

After time has been allowed for relaxing the entire left arm, the teacher continues, "Let's see you bend your left toes up and notice the control sensation in front of the leg (indicating). (See Leg 1, page127.) Do you get it? That's you doing! Right there! And let's just go negative now, power off, no power on at all! That's right!

"Next, let's bend the left toes down (See Leg 2, page 127). Where's the control sensation now? Point when you find it. (They point wrongly to the front of the leg.) No, that's strain! That's another signal, a different signal. Better say the name of this signal, which feels stronger than the control signal. Strain is a feeling of being pulled, isn't it? It is not a feeling of you doing, but of something being done to you!

"Now where *is* the control sensation. Where are you running your leg? In the ankle? No. (They point to their calf muscles) Now you've got it! That's the control!

"Now, let's put the right toes down. Where is the control sensation in the right leg? In the calf, isn't it? Easy, isn't it? Now let's have another recess."

The teacher may begin the following lesson, saying, "When you are driving a car, your foot can push down the accelerator pedal on the floor to make the car go faster. If you don't want it to go so fast, all you do is to press less. You work less with your foot: this is all. It is the same when you want your muscle to do less, you just relax, without working. Never make an effort to relax, because making an effort is working.

"You have no control like this light-switch. The light goes off only if you work to push the switch to the 'off' position. In you there is no switch on which you should work in order to go off with the power.

"I have seen pictures of little pygmies in Africa," the teacher may comment, "and they have little palm leaves and somebody has put some olive oil on the palm leaves and the pygmies are licking up the oil with their tongues just as a dog does, if you give him a chance. They would not be interested in learning how to run themselves like an automobile because they have never seen an automobile.

"They would have a hard time learning that the only way to relax muscles is without effort. You could not explain to them that when they bend their hands up there is no on-and-off switch in their bodies like this switch on the wall, for they have never seen an electric light switch. But you have seen many switches and you have used them to turn lights off. In you there are no switches like this light switch.

"You are not pygmies and it is easy for you to learn to relax. When the power is on somewhere, it is you doing something there. All you need do is to discontinue the doing—just don't do! This is the same as letting the automobile come to a stop without applying the brake. Just discontinue pressing the accelerator pedal. You have the same control in your muscles—the same kind of control as the foot-pedal. To get the power off, you do no work at all but just go negative. It is easy to relax—always easy—never hard."

We have illustrated the manner of approach to classes of children six to ten years old. Further instructions are to be carried out in the same manner, following the figures and directions on pages **128** to **143** . Complete coverage is not expected, but children learn fast and with profit.

Adult readers are urged to imitate what the children do to learn the ABC's of tension control. The procedures are basic and can be acquired readily as illustrated.

B. Pupils Under Four

Children old enough to play with dolls can begin to learn a little of self-control. Some may be about two years of age. For example, the rag doll can be made the subject of dialog. "Just see how Dolly relaxes", says the teacher, while the little one watches closely. "Her arms droop! Do you see how quietly she lies down?" "I walk about the room and she does not stir! Look at her, so quiet and relaxed!"

After some such interesting comments about the rag doll, the teacher herself relaxes for further example. If sufficiently skilled, she may drop inertly to the floor from a standing position without hurting herself, or, sitting, her head, trunk, arms and legs may droop quickly. In either instance, the child is encouraged to do likewise.

With further chat and example, the period of being a rag-doll can be lengthened. Each teacher may follow his own choice of course to bring this about.

The net result of such teaching by imitation can be greater quietude of the child and some correction of excessive tension if present before instruction was begun.

C. Kindergarten Teaching

Further advances can be undertaken with children four or five years old. Through tactful approach to older age groups, the rag-doll imitation can be introduced, if necessary. However, for the kindergarten group, the teacher can introduce control practices in parts of the body. For example, whie sitting he or she may let her arms drop dramatically. Again, he or she may let her head fall forward with abrupt let-go of neck muscles. Later, he or she may let the trunk drop forward with let-go of muscles of the entire trunk, anteriorly and posteriorly. An endless variety of such examples may be introduced. The class is to imitate and follow each example.

Terms used are important. The teacher should know why the practices should not be called "relaxation exercises". Any and every "exercise" properly so called depends on tensing some muscles. Accordingly the expression, "relaxation exercises" is self-contradiction. It is inconsistent with teaching skill to relax.

Unfortunately various writers of books based on the author's "You Must Relax" fail to grasp the effortless nature of letting-go. They do not understand that effort to relax is failure to relax. Such writers lack laboratory experience; they have never even witnessed action-potential measurement of muscles. Their ignorance results in disadvantage to their readers.

Accordingly, we repeat, no one can be taught to relax by means of "exercises" of any kind. Correct teaching and correct terminology go hand in hand. Children and adults can learn to be relaxed by relaxation *practices*, but *not* by exercises.

CHAPTER XIX

ILLUSTRATED PRACTICES

Practice makes perfect, at home or in school. When possible take time in daily periods of one hour as convenient.

Running Your Car

To run your car, you sit in the driver's seat and manipulate the ignition key, the accelerator, the gear shift or hydromatic drive, the steering wheel and the brake. These are the controls. See Figure 1 on page 124.

By manipulating the controls, you make the wheels go around at a rate and in the direction which suit your purposes. This is driving.

You yourself are a living instrument which can be run like your car, if you know how. You will be the driver, for nobody else can do it.

Note: (1) An abridged version of these instructions has appeared previously. (ANXIETY AND TENSION CONTROL. Lippincott, 1964.)

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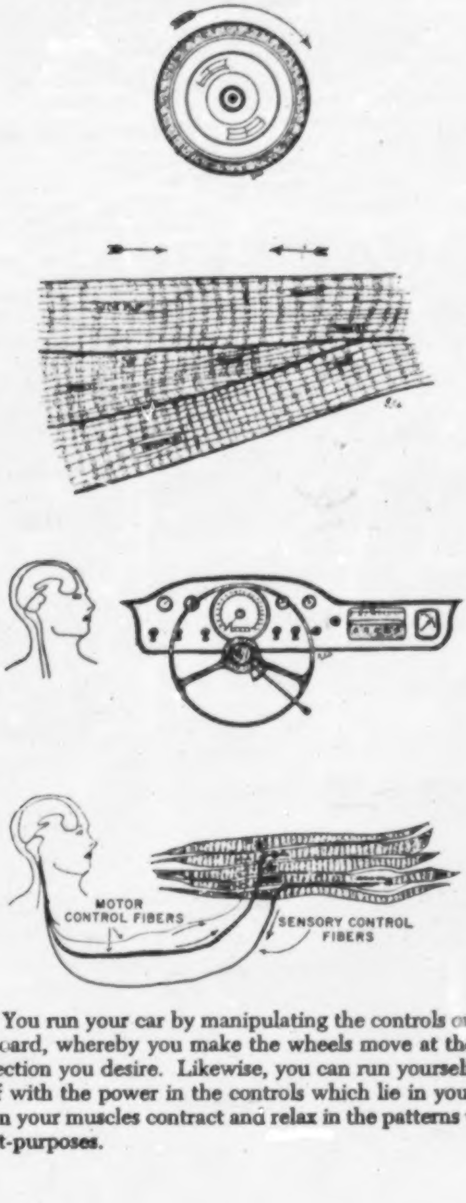
MOTOR CONTROL FIBERS
SENSORY CONTROL FIBERS

Fig. 1. You run your car by manipulating the controls on and near the dashboard, whereby you make the wheels move at the rate and in the direction you desire. Likewise, you can run yourself by going on and off with the power in the controls which lie in your muscles, whereupon your muscles contract and relax in the patterns which suit your effort-purposes.

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ARM PRACTICE

In each hour-practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are NOT exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

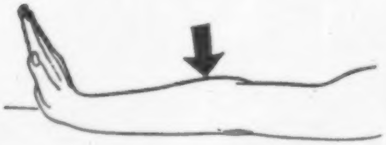
Periods	Left Arm	Periods	Right Arm
1.	Bend hand back.	8.	Bend hand back.
2.	Bend hand forward.	9.	Bend hand forward.
3.	Relax only.	10.	Relax only.
4.	Bend at elbow.	11.	Bend at elbow.
5.	Press wrist down on books.	12.	Press wrist down on books.
6.	Relax only.	13.	Relax only.
7.	Progressive tension and relaxation of whole	14.	Progressive tension and relaxation of whole arm

Arm 1 **Lying**

Period No. 1

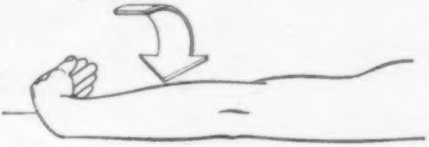
Select a quiet room, free from intruders and phone calls.

1. Lying on your back with arms at sides, leave eyes open 3 to 4 minutes.
2. Gradually close eyes and keep them closed entire hour.
3. After 3 to 4 minutes with eyes closed, bend left hand back (see photograph), observing the control sensation 1 to 2 minutes and how it differs from the strains in the wrist and in the lower portion of the forearm.
4. Go negative for 3 to 4 minutes.
5. Again bend left hand back and observe as previously.
6. Once more go negative 3 to 4 minutes.
7. Bend left hand back a third and last time, observing the control sensation 1 to 2 minutes.
8. Finally go negative for remaind[illegible]f hour.



Arm 1: Lying
Bend hand back. (Felt in back upper part of forearm)

Arm 2: Lying
Bend hand forward. (Felt in front of forearm)



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Arm 3 Lying

Period No. 3

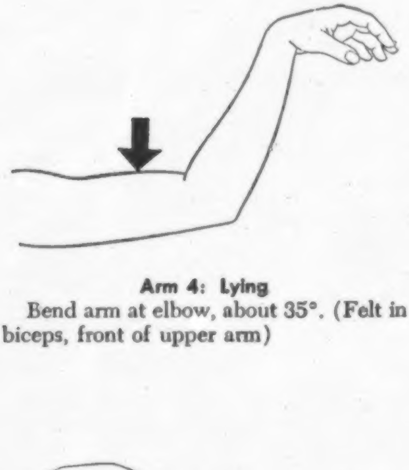
Lie quietly on back as previously, arms at sides. In this *and in all subsequent periods lying down,* leave eyes open several minutes, then gradually close them and *keep closed* for entire hour. Throughout this period go negative only: Do not bend, extend or stiffen the arm; but if you should do so, awaredly or unawaredly, note the slight control sensation which will thereupon appear in the left arm and go negative there at once.

Do not tense to relax.

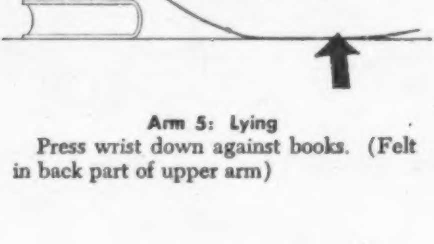
In General

Period No. 3 is called a zero period.

Hereafter, every third period is to be a zero period. In other practice periods, specialize on one tension only, performing the three times.



Arm 4: Lying
Bend arm at elbow, about 35°. (Felt in biceps, front of upper arm)



Arm 5: Lying
Press wrist down against books. (Felt in back part of upper arm)

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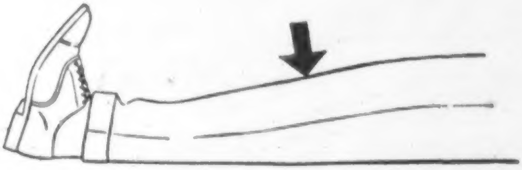
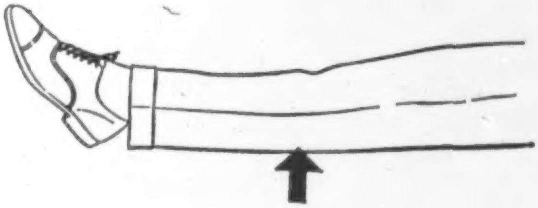
LEG PRACTICE Lying

In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

Day	Left Leg	Day	Right Leg
1.	Bend foot up.	11.	Bend foot up.
2.	Bend foot down.	12.	Bend foot down.
3.	Relax only.	13.	Relax only.
4.	Raise foot.	14.	Raise foot.
5.	Bend at knee.	15.	Bend at knee.
6.	Relax only.	16.	Relax only.
7.	Raise knee.	17.	Raise knee.
8.	Press lower thigh down.	18.	Press lower thigh down.
9.	Relax entire left leg.	19.	Relax entire right knee.
10.	Progressive tension and relaxation of entire left leg.	20.	Progressive tension and relaxation of entire right leg.



Leg 1: Lying
Bend foot up. (Felt along front of lower leg)



Leg 2: Lying
Extend foot. (Felt in calf)

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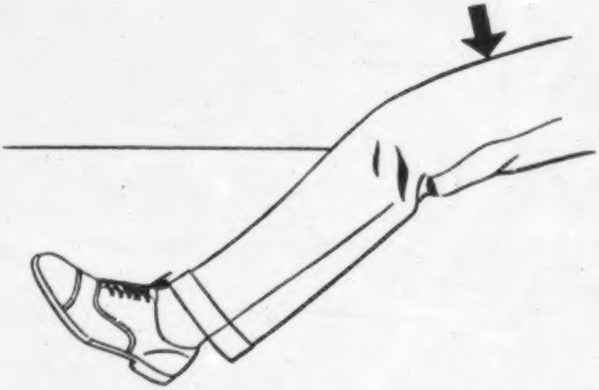
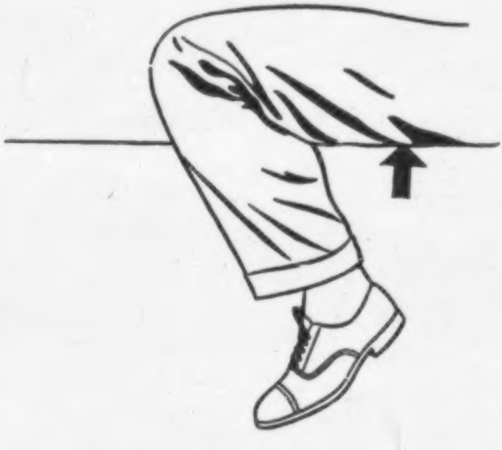


Leg 4: Lying
Raise foot and leg. (Felt in front part of thigh)



Leg 5: Lying
Bend leg at knee. (Felt along back of thigh)

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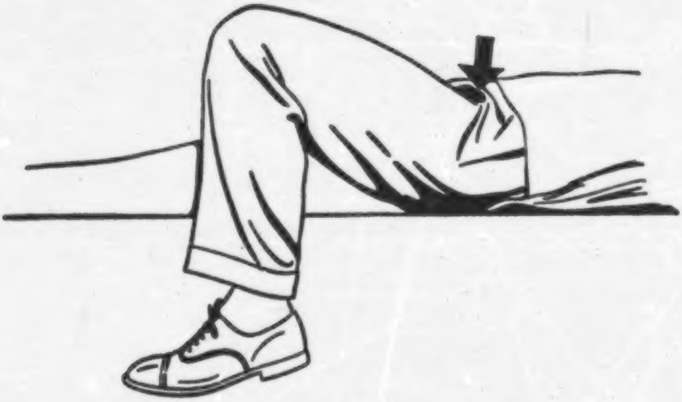
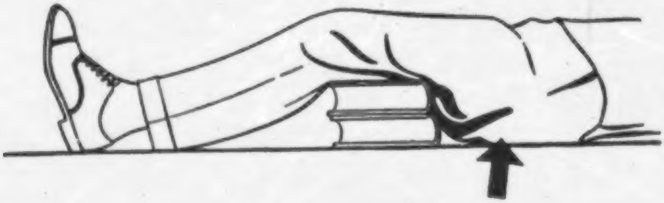


Leg 7: Lying

Raise knee, bending at hip. (Felt in muscles deep in abdomen, toward back, near hip)



Leg 8: Lying

Press lower thigh against books. (Felt in buttocks)

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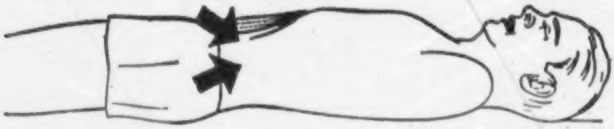
TRUNK PRACTICE

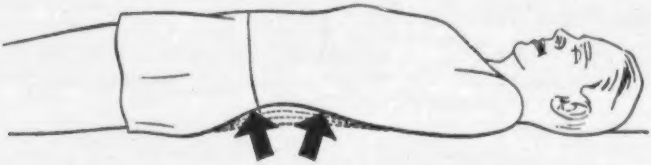
In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

Day	Trunk
1.	Pull in abdomen.
2.	Arch back slightly.
3.	Relax abdomen, back and legs.
4.	Observe during a deeper breath.
5.	Bend shoulders back.
6.	Relax only.
7.	Left arm forward and inward.
8.	Right arm forward and inward.
9.	Relax only.
10.	Elevate shoulders.



Trunk 1: Lying

Pull in abdomen. (Felt faintly all over abdomen)



Trunk 2: Lying

Arch the back. (Felt definitely along both sides of the spine)

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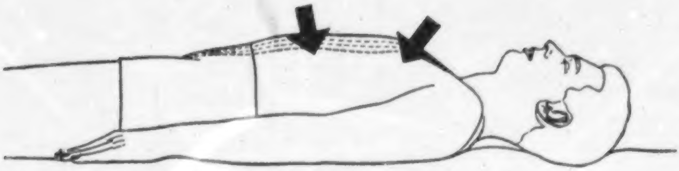
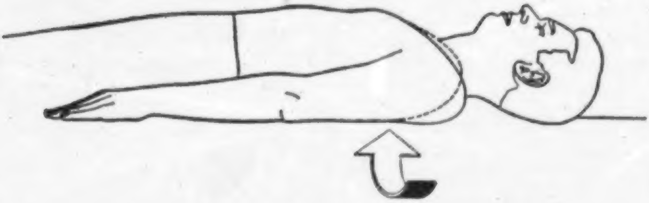
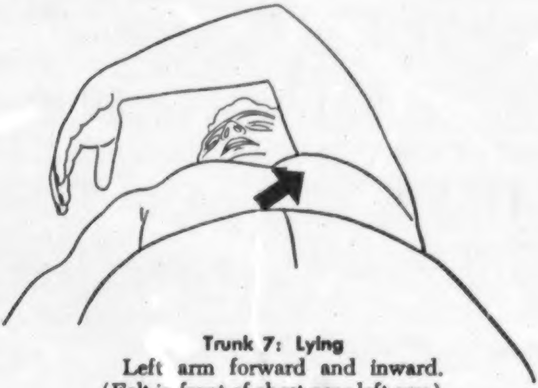


Trunk 4: Lying
Observe during a deeper breath. (Very faint diffuse tenseness felt all over chest)



Trunk 5: Lying
Bend shoulders back. (Felt in back, between shoulder blades)



Trunk 7: Lying
Left arm forward and inward. (Felt in front of chest near left arm)

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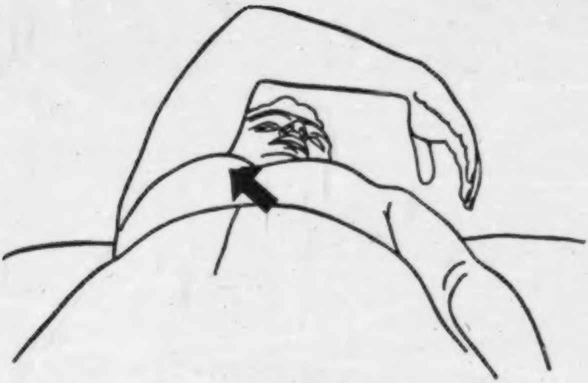
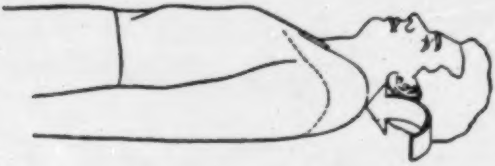


Trunk 8: Lying

Right arm forward and inward. (Felt in front of chest on right)



Trunk 10: Lying

Elevate shoulders. (Felt along top of shoulders and in sides of neck)

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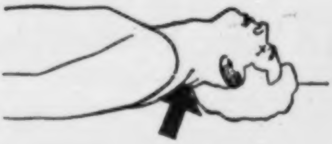
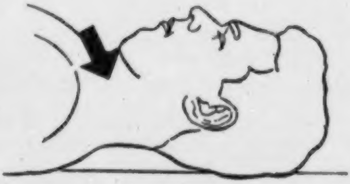
NECK PRACTICE Lying

In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

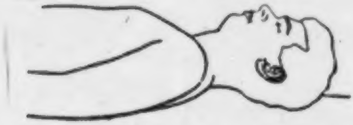
DAY	NECK, LYING
1.	Bend head back.
2.	Bend chin toward chest.
3.	Relax only.
4.	Bend head left.
5.	Bend head right.
6.	Relax only.



Neck 1: Lying
Bend head back. (Felt in back of neck, perhaps below, in back)

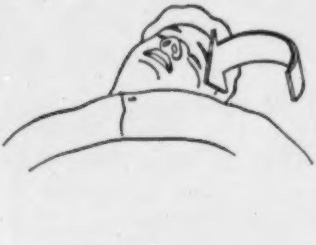


Neck 2: Lying
Bend chin down. (Felt in sides of neck)



Neck 3: Lying
Relax only.

Neck 4: Lying
Bend head left. (Felt in left side of neck)



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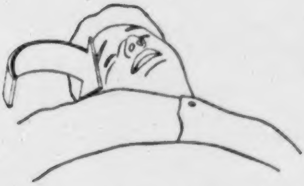
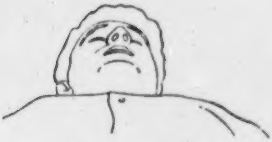


Neck 5: Lying
Bend head right. (Felt in right side of neck)



Neck 6: Lying
Relax only.

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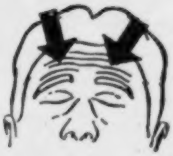
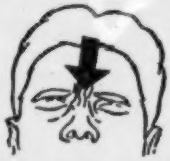
EYE REGION PRACTICE

In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

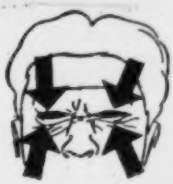
Day	Eye Region
1.	Wrinkle forehead.
2.	Frown.
3.	Relax only.
4.	Close eyelids tightly.
5.	Look left with lids closed.
6.	Relax only.
7.	Look right with lids closed.
8.	Look up.
9.	Relax only.
10.	Look downward with lids closed.
11.	Look forward with lids closed.
12.	Relax only.



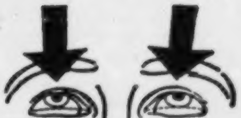
Eye Region 1: Lying Wrinkle forehead. (Felt diffusely over entire forehead)



Eye Region 2: Lying Frown. (Felt distinctly between eyes)



Eye Region 4: Lying Close eyelids tightly. (Felt all over eyelids)



Eye Region 5: Lying Look up (eyelids closed). (Felt in eyeball muscles at top; tensions change rapidly as eyes move)

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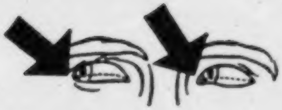
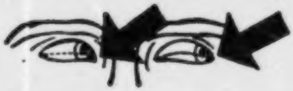
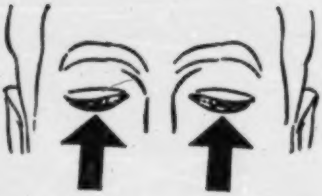


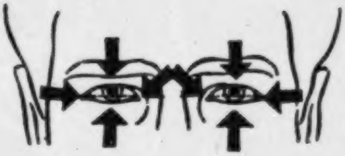
Eye Region 7: Lying
Look right (eyelids closed). (Felt in eyeball muscles, right; note static and moving tensions)



Eye Region 8: Lying
Look left (eyelids closed). (Felt in eyeball muscles, left)



Eye Region 10: Lying
Look down (eyelids closed). (Felt in eyeball muscles, below)



Eye Region 11: Lying
Look forward (eyelids closed). (Felt in muscles all around eyeballs)

VISUALIZATION PRACTICE

With lids open
With lids closed

In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

Day	Visualization
1.	Imagine pen moving side to side. Make it go very slowly. Make it stand still. Make it go very fast.
2.	Skyrocket train passing quickly. Man walking by.
3.	Relax eyes to zero.
4.	Bird flying from tree to tree. Bird still.
5.	Ball rolling on ground. Ball still. Eiffel tower.
6.	Relax only.
7.	Rabbit on road. Head of pin.
8.	President of U. S.
9.	Relax only.

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SPEECH REGION PRACTICE

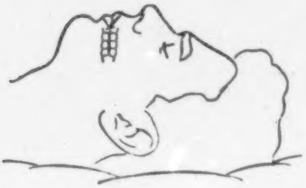
In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

DAY

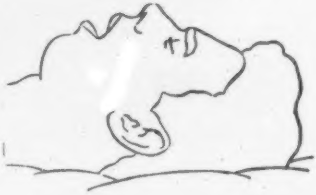
1. Close jaws somewhat firmly.
2. Open jaws.
3. Relax only.
4. Show teeth (as if smiling).
5. Pout.
6. Relax only.
7. Push tongue forward against teeth.
8. Pull tongue backward.
9. Relax only.
10. Count to 10.
11. Count half as loudly.
12. Relax only.

DAY

13. Count very faintly.
14. Count imperceptibly.
15. Relax only.
16. Imagine that you are counting.
17. Imagine you are saying alphabet.
18. Relax only.
19. Imagine saying name three times.
   Address three times.
   Name of President three times.



Speech Region 1: Lying
Close jaws rather firmly. (Felt at back of lower jaw and in temples)



Speech Region 2: Lying
Open jaws. (Felt in sides of lower jaw and neck)

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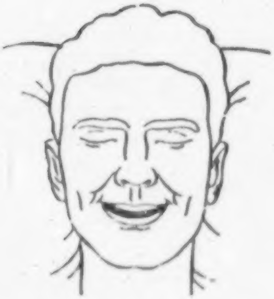
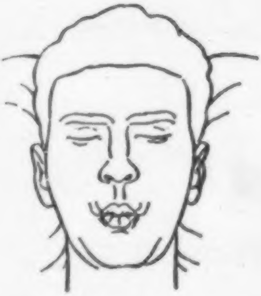
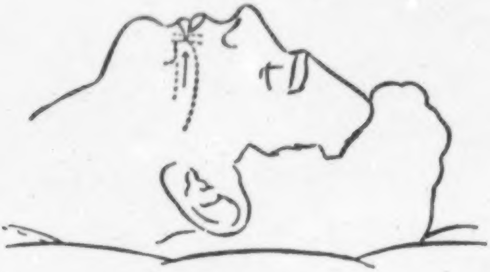


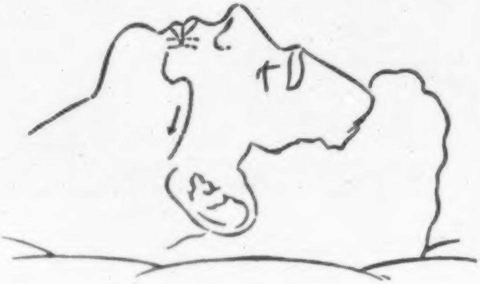
Speech Region 4: Lying
Show teeth (as if smiling). (Felt in cheeks)



Speech Region 5: Lying
Pout. (Felt in and around lips)



Speech Region 7: Lying
Push tongue against teeth. (Felt in tongue)



Speech Region 8: Lying
Pull tongue backwards. (Felt in tongue and floor of mouth)

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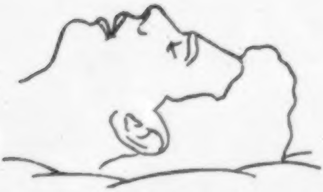
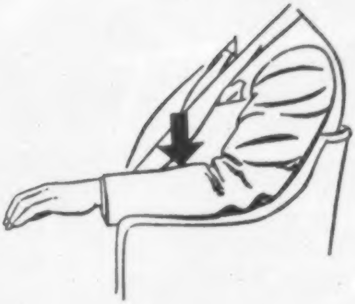
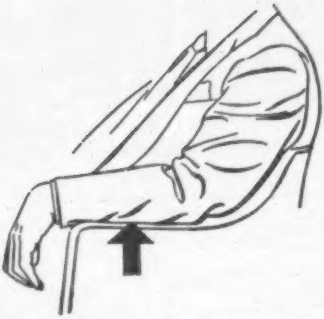


Speech Region 10: Lying
Count to 10. (Felt in cheeks, lips, tongue, jaw muscles, throat, chest and, perhaps, abdomen)

Arm 1: Sitting
Bend hand back. (Felt in back part of forearm)





Arm 2: Sitting
Bend hand down. (Felt in front part of forearm)

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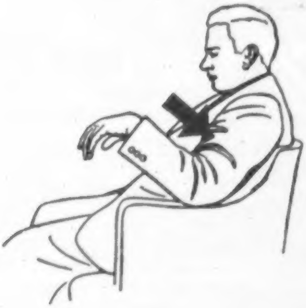
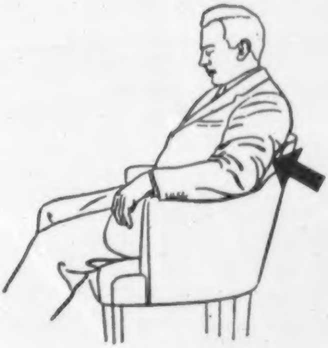
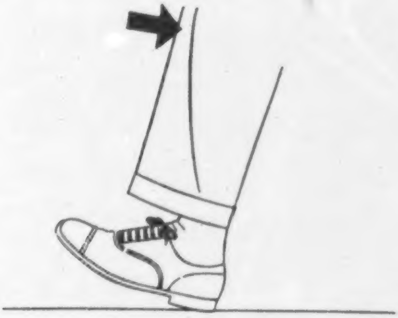


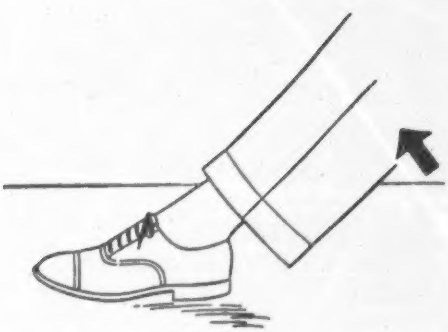
Arm 4: Sitting
Bend arm at elbow. (Felt in biceps, front of upper arm)



Arm 5: Sitting
Press wrist down against arm of chair. (Felt in back, upper arm)

Leg 1: Sitting
Bend foot up. (Felt along front of lower leg)





Leg 2: Sitting
Press toe end of foot down. (Felt in calf)

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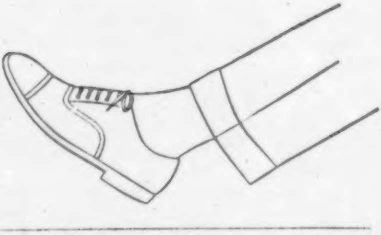
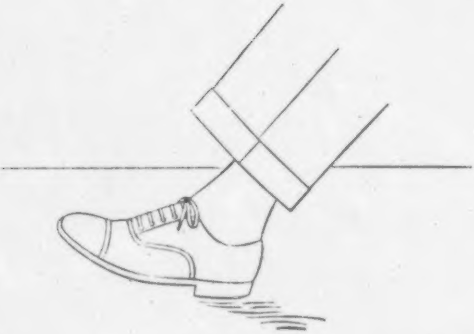
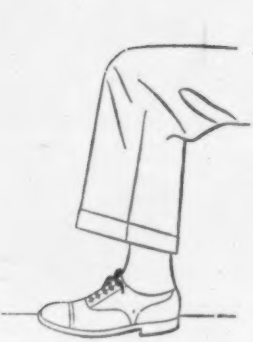
Leg 4: Sitting
Raise foot without moving thigh. (Felt in front of thigh)

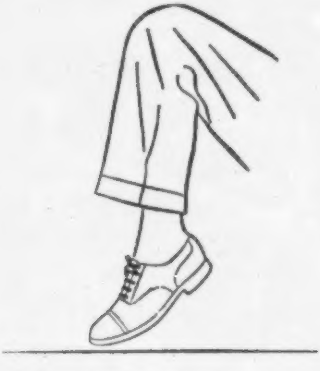




Leg 5: Sitting
Pull heel back without moving thigh. (Felt along back of thigh)



Leg 7: Sitting
Press down whole foot. (Felt in buttocks)



Leg 8: Sitting
Raise knee while foot hangs limply. (Felt in psoas muscles deep in abdomen, toward back)

NECK PRACTICE Sitting

In each daily practice period, follow the appropriate photograph, performing the tension indicated 3 times at intervals of several minutes. These are *NOT* exercises. Interest yourself in becoming familiar with the control sensation in each part so that you can learn really to run yourself properly relaxed under all conditions.

DAY	NECK, SITTING
1.	Bend head back slightly.
2.	Bend chin toward chest.
3.	Relax only.
4.	Bend head right.
5.	Bend head left.
6.	Relax only.
7.	Head erect. Relax neck as far as possible.

LEGEND FOR TABLE 1

CHANGES IN ACTION POTENTIALS AFTER TRAINING IN RELAXATION

George Williams College,
Course PA 175 — Spring, 1961

This course in progressive relaxation, bearing 1 credit, included about 15 hours of muscle training. In addition, approximately 3-1/2 hours were spent on theory. Lessons were given twice weekly, and home practice was advised. A true-false, multiple choice test was taken at midterm and an oral examination at the end of the course. The class was taught in three sections. All voltmeter tests were done with a portable instrument.

On the average, forehead tensions of these 30 pupils were reduced 44.5 per cent.

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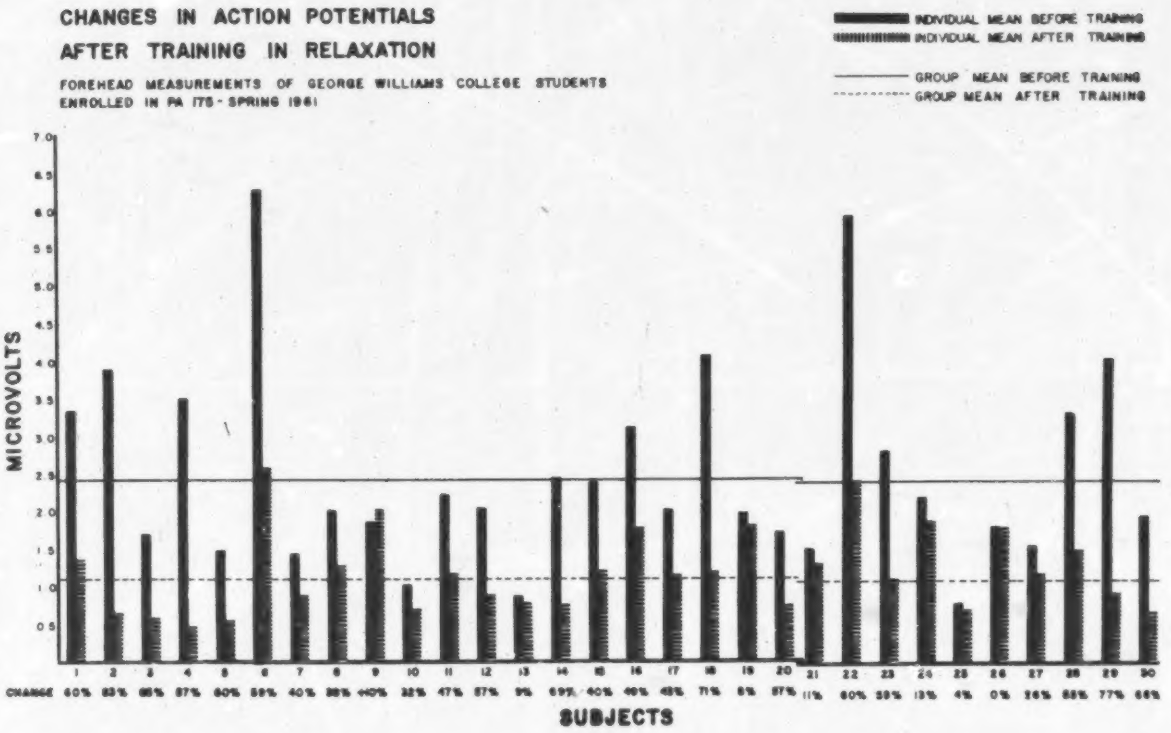

CHANGES IN ACTION POTENTIALS AFTER TRAINING IN RELAXATION

FOREHEAD MEASUREMENTS OF GEORGE WILLIAMS COLLEGE STUDENTS ENROLLED IN PA 175 - SPRING 1961

FURTHER READING

Jacobson, Edmund

YOU MUST RELAX, McGraw Hill Book Company, revised edition 1964

ANXIETY AND TENSION CONTROL, Lippincott, 1964

PROGRESSIVE RELAXATION, University of Chicago Press, Revised Edition, 1938, 11th printing, 1971

HOW TO RELAX AND HAVE YOUR BABY, McGraw Hill Book Company, 1959

Dewey, John, HUMAN NATURE AND CONDUCT, Henry Holt and Company, 1930

Bugelsky, B. R., THE PSYCHOLOGY OF LEARNING, Holt, Rinehart and Winston, 1956

Ausubel, D. R. and Robinson, F. G., SCHOOL LEARNING, Holt, Rinehart and Winston, 1956

Davitz, J. R. and Ball, S., PSYCHOLOGY OF THE EDUCATION PROCESS, McGraw Hill Book Company, 1970

Travers, J. F., FUNDAMENTALS OF EDUCATION PSYCHOLOGY, International Textbook Company, 1970

Torrance, E. P. and Myers, R. E., CREATIVE LEARNING AND TEACHING, Dodd, Mead and Company, 1970

$3.95

TEACHING AND LEARNING

New Methods For Old Arts

People trained to conserve their personal energy can accomplish more, according to the laboratory and clinical findings of Dr. Jacobson. A scientific method of "relaxation" was first presented by Dr. Jacobson at Harvard University in 1908. Since then, he has devoted much of his time, energies and personal means to improving the technique and making it available to mankind. He has written about it extensively in medical and other scientific journals. His methods have been discussed in journals of education. YOU MUST **RELAX**, prepared for the layman, became a best seller when first published in 1934. Subsequent editions met with equally popular response.

In consequence of his efforts, "relaxation" has come to mean physiological rest. It is the subject of newspaper and magazine articles. Corporations have supplied group instruction to key executives in order to improve productivity and preserve health. The Navy in World War II employed the technique successfully in mass training of air cadets so as to reduce tensions in pilots. The Canadian National Department of Health and Welfare during the nineteen sixties granted funds to the University of Montreal for two years of research on teaching tension control under Dr. Jacobson, to stammering and stuttering children.

Dr. Jacobson, an internist, diagnostician and psychiatrist, has been teaching his field to patients, educators and others for decades. He is Director for the Laboratory for Clinical Physiology. In earlier years, 1926-1936, he was Research Associate and Assistant Professor in Physiology at the University of Chicago. He is also the author of PROGRESSIVE RELAXATION, published by the University of Chicago Press; TENSION CONTROL FOR BUSINESSMEN, Whitehall present publishers; ANXIETY AND TENSION CONTROL, Lippincott, publishers; MODERN TREATMENT OF TENSE PATIENTS, Thomas, publishers; BIOLOGY OF EMOTIONS, Thomas, publishers.

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